STUDENTS’ SOCIAL EXPERIENCES THROUGH INVENTING GAMES

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Abstract

Although small group work is often used as a pedagogical tool in physical education (PE), little is known about factors that affect the social experiences of the students, as reported from their own perspective as they work in a small group setting. The purpose of this research was to enable a number of grade eight male students to share their lived social experiences as they engaged in an Inventing Games (IG) unit. This study was framed within a wider study, conducted by the principal investigator (Dr. Joy Butler), and initiated under the auspices of a Social Sciences and Humanities Research Council grant in 2009. The goal of the larger project was to investigate how IG, an educational program in Physical Education (PE), can support the development and awareness of principles of ethical actions as they become manifest in situated and collaborative learning contexts (Butler, Hopper & Davis, 2009). My study focused on one group within my PE class. The students in the focus group shared their social experiences through journals and interviews over the course of an eight-session unit. I used a phenomenological approach to analyze the data and in the process I identified four themes: (a) inclusion within the decision-making process, (b) acknowledging ideas, (c) student-selected team selection process, and (d) relating the IG experience to “real-life.” These four themes became apparent through a process of applying a complexity thinking lens to examine the ways in which the focus group could be understood in terms of a complex adaptive system, and to identify the ways in which the conditions of complex emergence were established to allow for emergent learning within the group. This study has had an impact on my teaching practice and, in turn, could have implications for the wider PE community. For example, on the basis of valuable insights gained from the students in the focus group, I have achieved a better understanding overall of the social experiences of students as they engage in PE, and am consequently better equipped to look out for hidden negative social experiences that can occur in small group settings.
Preface

The research was conducted under the auspices of the University of British Columbia and contributed towards the completion of my Master of Arts degree. The study reported here took place within the Vancouver School District. Approval for this study was granted at the outset of this study by the University of British Columbia’s Behavioral Research Ethics Board (certificate H10-01114), and by the Vancouver School Board. I, Kevin Sandher, acted in the role of researcher and co-investigator, and my research was overseen by my Principal Investigator, Dr. Joy Butler.
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Glossary

The following terms are frequently used in the text of my thesis and are defined here as an aid to the reader.

**Agent:** a person or a thing that participates or interacts with a system, and is subsequently changed because of this interaction. For the purposes of this study, students within each Inventing Games (IG) group are seen in terms of agents within a system (Ovens, Hopper & Butler, 2013).

**Complex Adaptive Systems:** “A collection of individual agents who have the freedom to act in ways that are not always totally predictable, and whose actions are interconnected such that one agent’s actions change the context for the other agents” (Ovens et al., 2013, p. 4).

**Conditions of Complex Emergence:** These are conditions that are present in order for a complex adaptive system to form. For the purposes of this study, the teacher-researchers from the larger study (including myself), and the principal investigator of the larger study, Dr. Joy Butler, structured the IG unit at the centre of this study in such a way as to create the conditions that promote new and often unexpected properties to emerge (Ovens et al., 2013).

**Emergence:** The arising of new, unexpected structures, patterns, properties, or processes in a self-organizing system (Ovens et al., 2013).

**Game Design Process:** The process that the students initiate as an outcome of the IG unit in order to create a game that can be played by their selected group. This process includes collaborating with group members with respect to rules, scoring systems, and boundaries. For this study, I was particularly interested in the students’ social experiences during the game-design process.
**IG Focus Group:** A group of seven students was selected as focus group from a class of 28 Grade 8 PE students using the process of taking names “out of a hat.” The reasons for this were (a) the larger study, on which my study was based, used this method (due in part to the budget limitations on transcription costs), and (b) by following a single group I was able to get a deeper understanding of the social experiences of the seven students that formed the focus group.

**Inventing Games (IG):** A formal process whereby teachers work with students to take them through the process of designing their own games. In this process they are required to make crucial decisions, and negotiate the rules once the game has been tested. Inherent in inventing games is the ability of the players, as a group, to modify and manipulate the game to make it more “playable.” Through that process students are able to develop the tools to independently modify the complexity of their game in order to ensure that the game will include all ability levels (Butler, in press).

**Teaching Games for Understanding (TGfU):** A physical education curriculum model based on a conceptual framework, which classifies games into core categories and provides a developmental structure for teaching and learning games (Griffin et al., 1996).

**Territorial Games:** A category of the TGfU games classification system (Thorpe, Bunker, and Almond, 1986) where the primary aim of the game is to invade the area defended by the opponents, either by shooting an object in, or by taking an object out of play into a defined goal area. For the purposes of my study, the students were required to create a territorial game.
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I would like to express my sincere appreciation for the people who have supported me along the way through the various stages of the research and writing of this thesis.

Foremost, I would like to thank Dr. Joy Butler for encouraging me to participate in the Inventing Games research group as well as the TGfU Master’s cohort. Her dedication to the Physical Education field has inspired me to continue to reflect and improve on my teaching practice. I would also like to thank the instructors in the TGfU Master’s cohort who have not only provided assistance over these past two years, but who have had a significant impact on my teaching practice: Dr. Tim Hopper, Dr. Jeanne Kentel, Dr. Jamie Mandigo, Dr. Steve Mitchell, and Joanna Sheppard. In addition, I would like to thank Gail Wilson for introducing me to TGfU during my undergraduate studies in Human Kinetics at UBC.

This undertaking would not have been possible without the participation and insights of my students, who continue to inspire me to become a better teacher. I owe them my heartfelt thanks.

Many thanks also to my mother and father for their unconditional love and their endless support for everything I have done in my life. I can say, without hesitation, that without this support the road to success would have been exponentially more difficult. To my brother, who figures so prominently in this thesis, thank you for all of the good times we had playing together as children. I cherish those memories.

Finally, I am deeply grateful to my wife Jenny. I can’t believe we got through the last year! Without your support at home, I could not have completed my writing. You are the glue that holds our family together, and for everything that you do for our children and for me, I thank you.
Opening Narrative

One of my fondest childhood memories is heading for the backyard every morning during the summer holidays with my younger brother and a few friends. Here, we would play different games, literally all day. We would gather whatever equipment we had in the garage, come up with a few quick rules, adapt the game to the playing area, come up with a scoring system, pick two teams, and start to play. My mother would leave us to our own devices for the most part, but she did set some constraints that had to be met before we could play.

The most important constraint was that we had to include all the children wanting to play (including my younger brother). My mother taught us, from an early age, the importance of including everyone. She also insisted that we use proper safety equipment, that we stay out of the garden, and that we stay off the street. The constraints (enabling constraints) that my mother put on our games made us think about the value of inclusivity and safety and, in the end, we found that these constraints made the game more fun and more challenging.

If we found that the game wasn’t working well once we started to play, we would stop and discuss ways in which we could improve it. As children, these interactions helped us build the important social skills of achieving consensus, resolving disagreement and conflict, and making decisions by a majority vote. Most of the time we began with the democratic strategy of majority rules; then, we would simply try out the rules by playing the game (trial and error) to see if they needed further revision.

Sometimes my younger brother felt he did not have much input in the process of revising the game, in which case he either went along with our solution, or ran inside to tell my mother that he was being excluded. This certainly caused more problems, especially if my father got involved. My mother would require that we include him and, more often than not, we would either modify the game or change the teams while still making the game enjoyable and challenging for everyone. This process helped my brother improve his skills by playing with older and more experienced players, and it allowed me to see the value of including all age and ability levels in the game.
As I think back on these experiences, and compare them with my current research on Inventing Games, I have come to understand my reasons for initiating this study. First, my fondest childhood memories revolve around playing games in the backyard with my brother and my friends. Secondly, the social aspects of playing games—the sharing of jokes and talking about sports—allowed me to build social skills that have provided the foundation for my ongoing adult interactions with students and colleagues. Thirdly, the values and interpersonal skills these games engendered, such as such conflict resolution, inclusive decision making, and active listening, continue to serve me well, both as a teacher and as a father.

Finally, as I look back on my childhood, and on the process of “inventing” games, I have come to realize the importance of my mother’s role in giving us the autonomy to play on our own while still providing us with a framework within which we had to play. The balance that she achieved—between allowing us freedom and constraining the structure of our play—allowed us to learn that we could cooperate while still having fun. Her requirement for inclusivity has helped shape me as a teacher, and it has allowed me to confidently promote the value of including all students in a meaningful way as they participate in my PE classes.
Chapter 1: Introduction

A number of factors have contributed to shaping me as a teacher of physical education. One of the most important is my own love of sports. Much of my love of sports grew out of my childhood experiences playing games with my brother and friends. This study has allowed me to reflect formally on these experiences, and come to an understanding of how these experiences in turn inform my practice as a physical education teacher.

The opening story attempts to summarize the way in which my mother provided us with a model for the values that are intrinsic to playing sports, such as fairness and inclusivity—values that I now pass on as a teacher and a father. If my mother had not placed such a high value on inclusivity, my brother and I would not have been able to create and play games together in the backyard in the way we did. It was the requirement for inclusivity set out by my mother that enabled us to construct games in which we could both meaningfully participate. In addition to learning systematically about inclusivity, as children we also developed the important social skills of cooperation, negotiation, and conflict resolution. All these experiences have had a significant impact on my teaching philosophy.

In the process of my participation in the Inventing Games (IG) research group over these last four years, I have been able to examine the experiences of my students as they have created games in my physical education (PE) class, and to compare these experiences to those I remember from my childhood. The difference between the two experiences—playing games in the backyard, and the formal IG process in the setting of a PE class—is that the latter has specific, formal learning outcomes (physical, cognitive, and social) which are defined by the teacher and which take place in the social environment of the classroom for which the teacher is responsible.

1.1 Overview

The goal of this research project was to gain a deeper understanding of the lived social experiences of students as they participated in an IG unit. This understanding was to be
gained by using a complexity thinking framework. This study is situated within a wider study conducted by Dr. Joy Butler in which I was involved as a teacher-researcher. The wider study included five other teacher-researchers from across the province who would be teaching similar IG units to their PE classes.

My study concentrated on a single IG “focus” group which I identified within one of my PE classes. This group included seven Grade 8 boys who were to work collaboratively to create a game. My study was focused on the social experiences of the individual students in the IG focus group as they engaged in the game design process. I used a phenomenological approach to encourage the students to share their lived social experiences, and by so doing all the students in the class were able to have some input into their learning situation, and I was able in turn, as the teacher-researcher, to glean valuable insights into how the students experience PE as they worked together to create a territorial game. As a way of bringing my recollections of playing games as a child to my current role as a teacher, I used autobiography to relate my social experiences to those of the students’ perceptions of their experiences in the course of the IG unit.

One of my aims is to prompt physical education teachers to think about their own childhood experiences playing games as a way of encouraging them to connect more personally with their PE classes by way of the IG process. My own reflections, as they are presented in various sections of this thesis, are indicated in italics.

The aim of this chapter is to identify the problem that this study addressed. I will review the fundamental considerations that guided this study, including the way in which PE can contribute to the development of the whole child and, specifically, how the process of Inventing Games fits with principles of Teaching Games for Understanding (TGfU). I will also refer to the wider study within which my study was based. See the Glossary for a list of terms used in this thesis.
1.2 The research problem

I undertook this study as a physical educator with some years of teaching behind me. The opportunity to participate in a wider study as a teacher-researcher provided a timely opening for me, allowing me to critically reflect, both on my own teaching practice and on problem areas in my field that I felt needed attention and improvement. In the course of my participation in this study, two things became clear to me: First, it seems that we know little about how students, especially some students, perceive their social experience of physical education. And second, we are not well-equipped, in the context of traditional models for teaching physical education, to better accommodate students who have negative experiences.

How do we understand the lived social experiences of students as they participate in PE? And, how do we bring this understanding to our classroom setting to better accommodate a diverse population of students, many of whom may have negative feelings about PE? How do we encourage students to voice their experience with PE, and share their perceptions with each other?

This study has revealed, first, that there is a lack of research that looks at student perceptions of PE, especially at ways to enable students to communicate their experience with PE to each other and to the teacher. And, second, that there is little research that addresses the issue of teaching the whole student in PE (with equal attention to their social experience). The following sections will expand on these issues and illustrate ways in which the process of participating in an IG unit can help to address these issues.

1.2.1 The diversity of student experiences with PE

As I developed my study in the context of the wider study and considered how to focus the problem I wanted to address, I was reminded of a conversation I had with a student after PE class one day. The student mentioned to me that he did not really like coming to PE, and that it was his least favourite subject. I was surprised to hear this because he was a student who I was certain participated happily and to the best of his ability. When I asked him to explain why he did not enjoy PE, he said that he didn’t like working in small groups (a pedagogical
strategy that I frequently use). When I asked why, he said that he felt his ideas were always excluded because of his lack of experience with sports. When I asked why he had not mentioned this to me (or to other PE teachers), he gave an answer that has stayed with me ever since: “Because no one ever asked.”

After this, I began to consider asking for student input when developing lesson and unit plans, and asking students to share their experiences in the course of working in groups. Rovegno and Kirk (1995) emphasize that before we, as teachers, can successfully create inclusive and enjoyable PE environments, we must enable children to share their experiences. A specific aim of this study was to empower students to share their social experience of PE, especially as they experienced working in small groups. My expectation was that this would give me the means by which to critically reflect on my teaching practice. Ultimately, I would have children enjoy PE, especially game play, in the way I did as a young person.

1.2.2 Teaching the whole student

Physical education is an integral part of a general program of education common to schools in North America. It is designed to contribute to the total growth and development of all children, and it is seen to be unique in the school setting because it addresses all of the learning domains: psycho-motor, cognitive, affective, and social (Gulay, Mirzeoğlu, & Dulay, 2010). However, I also understand that, while PE may well have the potential to address the “whole” student, Light and Fawns (2003) remind us that the widely accepted method of instruction is often not conducive to learning for many students given its traditional focus on the “physical dimensions of games isolated from their social and cognitive dimensions” (p. 161).

Early in my teaching career I taught games using a traditional approach that focused on delivering knowledge and emphasizing correct and efficient ways to carry out skills. I felt that successful teaching was based on strict classroom management and efficient lesson planning. All of these beliefs reflected a worldview that values compliance, efficiency, and order. Although this teaching style did deliver the curriculum efficiently, I did notice that not
all students were enjoying PE and games as I once did. This prompted me to reflect more critically on my teaching practice, making me particularly attentive to methods geared more towards involving the whole child: the physical and the social. It was at this point where I was given the opportunity to join the IG research group as part of the Teaching Games for Understanding (TGfU) cohort in the graduate program at UBC. Inventing Games (IG) addresses the whole student, as a responsible member of a wider society, and aims to expose students to the principles of fair play in the process inventing their own game (Butler, 2013, p. 13). For the purpose of my study, as a PE teacher, I was particularly interested in examining the social experiences of students as they engaged in the process of inventing a game in a small group. The next section will outline why I chose to focus on the students’ social experiences for my study.

1.2.2.1  Social experience

Studies have shown (Eldar, 2006; Butler, in press; Bailey, 2006) that PE is seen as a “suitable avenue for addressing social experiences due to the frequent and varied interactions that take place between students” (Grineski, 1996, p. 125). A great deal of literature has focused on the psycho-motor domain within PE (Rovegno and Kirk, 1995), and neglected to a large extent the social/affective domain. This study attempts to address this gap in the literature by focusing on the way in which students interacted socially as they designed their game within small groups. I was specifically interested in the way the students shared their experiences—and whether they felt empowered to do so—during the game design process. The outcome of this study has given me an “inside” perspective on the complexity of these interactions.

In summary, I have outlined the two issues that this study addressed: (a) the need for more research that takes account of student perspectives on their experiences with PE, and (b) the way in which the insights gained from this research can be incorporated into the classroom to accommodate what we learn from the student perspectives—especially with respect to enabling students to voice their perceptions of participating in group PE activities.
1.3 Inventing games

This section will outline the major components of the IG process, and consider why it is seen as an appropriate vehicle for addressing the development of the whole child, particularly the social domain as it is encountered in PE. The main components of the IG process will be identified here, along with some of the benefits that have been highlighted in the research literature. I will describe the way in which IG addresses the social domain and sheds light on the importance of the teacher in managing this domain in the IG process.

1.3.1 Overview

Inventing Games (IG) is an educational program that PE teachers can use to achieve the aim of increasing social interactions amongst students in authentic meaningful contexts. IG is an offshoot of Teaching Games for Understanding (TGfU). It formalizes a process that gives students the opportunity to work collectively towards the common goal of creating a new game and, in the course of creating their game, provides the students with a way of understanding the impact of their contributions to their group. Other authors have labelled the process of students creating their own games with different names, such as Games Making (Almond, 1986; Ellis, 1986), Children’s Invented Games, (Castle, 1990), and Student-Designed Games (Hastie, 2010). IG aims to build on the past literature by putting more of focus on the social aspects of inventing a game.

Research shows that learning through the process of game construction can produce a number of benefits in the social and affective learning domains. Almond (1986) reported that students felt a sense of ownership and involvement in their own learning when they were involved in the process of an Inventing Games unit. He also pointed out that students learned how to cooperate and communicate more effectively when confronted with the challenge to create their own game. Moreover, students almost always report that their invented games are more fun, more inclusive, and more “playable” than traditional mainstream games (Butler, in press). In this way, it seems that students become part of a dynamic, inclusive, and nurturing community that fosters and shapes learning (Curtner-Smith, 1996).
A first principle of this program is that learners co-create their own games, based upon the four games categories outlined in TGfU. These categories are: target, net, striking, and invasion. Once they set out their idea of a game they think would work, they discuss how to adapt and refine these categories (Butler, in press). The role of the teacher is to encourage the students to make their games “more inclusive and enjoyable for all participants by developing and modifying their rules and structures” (Rovegno & Bandhauer, 1994, p. 61). Within each group, students are required to adapt to the constraints of the game, and to self-organize as a group with a common intent. In the process of trying out ideas, they gravitate towards selecting the emergent processes that seem to work for them (Butler, 2013).

The basic constraint for this study was that students were required to involve all the members of the group, at the very least by providing them with an opportunity to share their ideas in the process of developing the game. The hope was that, as students created their own game—within the parameters of the teacher-imposed guidelines around inclusion—“learners would be enabled to construct a shared (and negotiated) understanding of the game, along with a sense of ownership over the game, and of the learning experience itself” (Butler, 2013, p. 108). To achieve this aim, i.e., working as group on the basis of an inclusive game design process, all groups were required to design a game where inclusiveness was a primary consideration, and they had to do this at the outset of the unit. As the students attempted to work cooperatively to revise their games in light of the policy of inclusivity, they had to incorporate the group decision-making process, which meant that they had to grapple with the proviso that the opinions and ideas of the all the group members had to be heard and met with respect.

1.3.2 IG and the social domain

My study is framed within a wider study that examined the way in which IG can support the development and awareness of the principles of ethical actions. I joined this research group three years ago (along with five other teacher-researchers). Our common interest was to examine ways in which we could enhance our teaching practices to take the whole child into account, i.e., to broaden our focus to included more than the teaching of physical skills alone.
The formal process of inventing games in the context of the PE curriculum has the potential to contribute to the growth of the whole child: It allows students to use their psycho-motor abilities as they play their games; it engages the cognitive abilities of the students as they devise tactics and rules for their game; and, it engages the social and affective domains as students interact in the setting of the small group.

As noted above, the focus of this study is to look at the social interactions of the students within their IG groups, and to take into account the student perceptions of these interactions. The process of inventing a game, as structured by the IG unit, functions to activate the social domain in the setting of PE; it encourages students to collaborate within a “collective approach, where students are empowered to shape their own learning which stimulates social interaction through which ideas, concepts and understanding emerge” (Light & Fawns, 2003, p. 163). As students work to create their game, they are given the opportunity to practice the essential social skills of cooperation and leadership; they are encouraged to develop perseverance and courage, and they are prompted to adopt the values of loyalty and fairness (Butler, in press). As students encounter situations that prompt them to practice these social skills, they engage in a process referred to as educating “through the physical.” The IG process gives teachers the opportunity to develop lessons that incorporate moral development and “pro-social” skills, where movement is considered a vehicle for promoting educational objectives that are external to those of movement. (Eldar & Ayvazo, 2009).

By providing my students with the opportunity to learn “through the physical,” specifically through the IG process, I have shifted my practice beyond its primary focus on teaching physical skills towards a more holistic approach, thereby enabling me to become the teacher that I set out to be. This process, with its emphasis on the holistic, has allowed me to pass to my students the values that I learned as a child, values that will serve them well in PE and out in the world.
1.3.3 The role of the teacher

Many physical education professionals believe that students who engage in games and physical activities automatically develop positive social behaviors (Vidoni & Ward, 2009). While PE, to some extent, naturally activates and develops the social domain (not always in positive ways), it is up to teachers to plan their lessons to take into account the social domain of their students in order to give them the best chance to develop their skills as they participate in PE. Research has shows that students do not develop desirable social skills incidentally, as one might think when imagining the benefits of team sports (Buchanan, 2001). As with motor and cognitive skills, researchers agree that social skills must be explicitly taught, reinforced, and promoted (Brock & Hastie, 2007; Hellison, 2003; Vidoni & Ward, 2006).

My role as the teacher was to develop the IG unit, and to facilitate group interactions during the class. The unit was carefully structured—based on prior curriculum development work that was shared with other teachers in a wider research study—to provide the opportunity for all students to reflect on social experiences they perceived in the process of creating their game. I created additional structures, through class discussion and in concert with the students, that would make sure that everyone would be included in the game design process. This pre-unit interchange between the students, and between the students and their teacher, attempted to address the social issues that arose in the process of inventing a game. This was an important component of the IG unit because it allowed students to look more closely at the process of inventing a game, and drew attention to the goal: that the process was just as important as the end result (the invented game).

My additional role as a facilitator required that I circulate between the groups to encourage discussion (rules, scoring systems, and playing areas), and track the way each group was engaging with decision-making process (specifically, whether all students were actually contributing to the design of the game). Prior to this study, whenever I had students work in small groups, I rarely attended to the social interactions once they set to work as a group. I would usually leave the groups to their own devices, periodically checking to see if they
needed help. In the course of this study, I continue to be struck by Bailey’s (2006) admonishment: “The degree to which participation in physical education and sport contributes positively to a child’s social development depends on the action and interactions of teachers and coaches with the children and on whether or not these professionals realize its potential in this area” (p. 253). As I became more aware of the social experiences of the students as they created their game, I have also had to come to grips with the potential impact of the PE teacher on the social development of the students.

In summary, within the IG process teachers have an important role to play because they are responsible for “facilitating and designing contexts and situations that challenge [students] to make decisions about...how members of the team might work together more productively” (Butler, in press). The role of the teacher is key to connecting the decisions that the students make in the process of creating their game to the larger issues and values embedded in the unit. As I look back on my childhood, I realize that I made similar connections on the basis of the values my mother was trying to teach us as we played our own games.

The next section of this chapter will take a closer look at the wider study in which my study is based.

1.4 The wider study

This study has been framed within a wider study conducted by the principal investigator (Dr. Joy Butler), initiated under the auspices of a Social Sciences and Humanities Research Council grant in 2009. The goal of the larger project was to investigate how Inventing Games, an educational program in Physical Education (PE), can support the development and awareness of principles of ethical actions as they become manifest in situated and collaborative learning contexts. Six teacher-researchers took part in the study, including three teachers at the elementary level, and three teachers at the secondary level.

The three phases of the teaching and learning, situated through inventing games, developed in the following way:
First, teachers became conversant with the emphases and structures of IG, as well as the principles and conditions of complex emergence that were used to frame the research. They did this through reflective practice during seven, day-long workshop/research sessions.

Second, the adaptations that teachers made in the first phase as they reflected on their efforts to implement IG in their own teaching of Grades 4 or 8 were examined.

Third, the responses and performance of the Grade 4 and Grade 8 students were examined in relation to situated ethics as the teachers reflected on and developed units of instruction in the Inventing Games and TGfU game units.

My study, situated in the wider study, was structured around small groups of six or seven students. Out of these, as the teacher-researcher, I chose one group “out of a hat” as the focus group. Following the protocol of the wider study, each group in the class invented their own game—within the category of territorial games as identified by the Teaching Games for Understanding (TGfU) program—and each game was shared with the class. Four weeks after this process, students participated in a more traditional game, handball, from the same category.

1.5 Research question

This research will build on the work of previous studies that have explored the social experiences of students as they engage in PE. By encouraging students to share their social experiences—in what I understand to be an authentic and meaningful situation (the carefully developed IG unit)—I see the utility of this study in as much as it aims to provide a practical means to provide both a more holistic and a more enjoyable learning experience for students during PE. With this in mind, the main research question for this study was:

What are the lived social experiences of students engaged in an Inventing Games unit?
Chapter 2: Literature Review

The purpose of this literature review is to identify the authors whose work has made a significant contribution to my study. I will review a number of different theories of learning, and discuss their relationship to my study in the context of my theoretical framework—complexity thinking. I will identify the characteristics of complexity thinking, and examine its relationship to complex systems, emergence, and adaptation in the context of education (specifically, IG). I will propose that individual groups, as they participate in the IG process, can be seen to form a complex adaptive system. For this to happen, the conditions of complex emergence must be present, and I will describe the extent to which these conditions were present in this study.

In the second half of this chapter, I will review research relevant to the major aspects of this study, specifically as it concerns student-centred models in PE, i.e., TGfU, Sport Education, Cooperative Learning, and IG. I will also highlight studies that focus on students’ perspectives on their social experiences in the context of PE classes and other subject areas. The goal of this literature review is to focus the research in a way that will enable teacher practitioners to take a reflexive look at their beliefs and philosophies with respect to physical education.

2.1 Theories of learning

Although physical education teachers may not necessarily articulate clear beliefs about it, their practice invariably rests upon basic, unquestioned beliefs about learning. (Light, 2008)

I have included this epigraph because it highlights for me the extent to which my “basic unquestioned beliefs” have shaped me as a PE teacher. Over the course of my involvement over the last three years, in both the IG research group and the TGfU Master’s cohort, I have had the opportunity to “challenge [my] beliefs about learning and what good teaching is” (Butler, 1996, p. 32). I have come to understand that initiating the process of change must
involve some understanding of the theories that support the desired change, and the assumptions about learning upon which these theories rest (Rink, 2001). The IG research study has given me a clear understanding of how learning theory, specifically as it concerns complexity thinking, can inform my teaching practice. This next section will trace the concept of complexity thinking as it relates the theory of learning.

Davis, Sumara, and Luce-Kapler (2008) divide learning theories into two broad categories: correspondence theories, and coherence theories. Correspondence theories of learning are associated with behaviourism and mentalism. They generally imagine learning as a mechanical, cause-and-effect dynamic, and see learning as predictable and therefore susceptible to manipulation. These theories are largely based on the assumption that all learning occurs in the mind of the individual (Hopper, 2012). In contrast, coherence theories of learning—constructivism, social constructivism or social constructionism, cultural critical discourse, and ecological theories—all focus on the fit between the way an individual reads, or construes, a learning situation, and the context of the situation itself, including the corresponding or conflicting ideas of other individuals in that situation (Davis & Sumara, 2006). Hopper (2012) summarizes the learning dynamic characterized by coherence theories: “that through experiences, artifacts, or interpretive possibilities, individuals tend to construe some manner of adequate connection with what they know to what they are engaging with in a continuous process of adapting” (p.76).

This study is situated within the coherence theory of learning, and takes a social constructivist approach. It focuses on complexity thinking, where students are encouraged to work collaboratively, and to build on their prior experiences in order to create a new game that will include all the players. Before describing the characteristics of complexity thinking, a number of other learning theories will be discussed, including behaviourism, mentalism, and (social) constructivism. This will give teachers an understanding of the epistemology, or the way in which knowledge is conceptualized by of the various theories of learning.
2.1.1 Correspondence theories of learning

Traditional notions of learning conceptualize the mind as separate from the body, and propose a simplistic correspondence between internal knowing and external reality. According to Barab and Plucker (2002), correspondence theories, or entity-based theories of learning, “placed knowledge in the head of the learner, which led to the creation of educational systems that focused on transmitting content into individual minds” (p.75). Behaviourism, a form of correspondence theory, focuses on the observable and measurable: Learning is framed in terms of what the individual is doing, not what the individual is thinking. Teaching is essentially training, where the student is rewarded, or promised a reward, or where the student is punished, or threatened with punishment (Hopper, 2012). Behaviourism focuses on primarily on the body, and it sees it as separate from, and governed by, the mind. This view of human behaviour dominated theories of learning through most of the twentieth century, and it continues to have a strong influence in physical education.

Light (2008) notes that behaviourism is “underpinned by a view of the cognizing agent as being isolated from the world and mental activity as being distinct from physical experience” (p. 35). This dichotomy between thinking and experience has influenced the way in which physical education has been taught. The dualisms that have informed the teaching of physical education include the separation of thought from action, self from other, and knower from known, and subjective from. According to Davis et al. (2008), a behaviourist approach ignores that (a) the diversity of contemporary schools makes determining learning very complex, (b) individual human learning cannot be predetermined, (c) learning is not linear, and (d) humans learn from personal interest not by being forced by an external influence (p. 135).

Mentalism refers to a broad range of information processing theories (related to cognitive science) that rely on the premise that learning is a matter of building an internal model or representation of an external reality (Davis and Sumara, 2006). The most common metaphor employed by these theories is that of the computer, where incoming information is seen as “input,” something that requires storage, processing, and “output” in the form of ideas.
On the surface, mentalism, with its focus on unobservable internal constructs, seems quite different from behaviourism. However, both assume an irreconcilable separation between the mind and the body, between self and other (Davis and Sumara, 2006). In addition, according to Davis et al. (2008), both theories are based on a correspondence assumption about learning that focuses on an internal/external dichotomy and sees learning as linear and pre-determined. Good teaching, according to the mentalist conception, is perceived in terms of “highly structured curriculum sequences and instructional procedures with teaching focused on order, planning, prediction, management and evaluation” (Davis & Sumara, 2003, p. 125).

2.1.2 Coherence theories of learning

Coherence theories of learning see cognition as something that occurs not only in the mind, but as something that is embodied (Light, 2008). Learning is seen as being an essentially complex process, not as something that can be received by way of simple components. Nor is learning restricted to the measureable appearance of learning, but rather it is seen to include the immense range of implicit learning and knowledge that is enacted (Light, 2008). In coherence theories, knowledge is seen to include unformulated knowledge that is enacted in the course of daily life: “we know more than we know we know” (Davis et al., 2000, p. 66). Constructivism, social constructivism, cultural and critical discourse theories, and ecological theories are all examples of coherence theories of learning.

Constructivism theory—attributed to the renowned developmentl psychologist, Jean Piaget—is concerned with the sense that individuals make of their world. If it were to be characterized metaphorically, it would articulated as the way in which individuals construct an appropriate “fit,” but this process would better be described as a continuous construing, as a process of adjusting and adding on (Davis & Sumara, 2006). Piaget argued that learning is a continuous process of updating one’s sense of the world when prompted by new experiences. Piaget also saw the qualities of self-reference, self-containment, and internal consistency as aspects of the individual’s construed world. For Piaget, learning was a continuous process of adjusting one’s interpretation of the world in order to maintain a sense of coherence.
Social constructivism (or constructionism) theories tend to be more concerned with interpersonal dynamics and collective activity than they do with the personal construal associated with constructivism (Davis et al., 2008). Social constructivism theories focus on individual adaptations within a wider social system, and conceive of individuals learning through joint participation in the creation of community and society. Informed primarily by the work of Russian socio-psychologist Lev Vygotsky, this theory focuses on the processes by which individuals become participants in a particular community of practice.

The key assumption behind coherence theories is that a phenomenon or state will persist until the effort required to maintain this state exceeds the effort required to revise it (Davis et al., 2008).

2.1.3 Complexity theories of learning

Complexity thinking is somewhat of an umbrella term used throughout the formulation of coherence theories. Hopper (2012) argues that each coherence theory represents an instance of complexity thinking as we shift from a construing individual (constructivism), to a community of construing individuals (social constructivism), to culturally framed construing (cultural and critical discourse), to a co-evolving human learning system within other learning systems (ecological perspectives). The key difference between coherence and complexity theories is that complexity theories offer an expanded conception of what constitutes cognition and learning.

Complexity theories propose a radically different conception of “mind” from that of other coherence theorists. While coherence theorists acknowledge that the individual “mind” is shaped by sociality and culture, they locate the mind within the individual (specifically, in the brain) (Davis et al., 2008). Complexity theorists acknowledge the importance of individual context, but do not limit “cognition or mind to these locations but, instead, see mind as distributed across a range of complex systems” (Davis et al., 2008, p.84). Davis and Sumara (2006) note that, while “each human subject experiences a personal and individual consciousness, the systems of cognition that support this consciousness are not so easily
located or even traced” (p. 47). For complexivists, then, the “mind” is an emergent phenomenon that involves but also exceeds the individuals who experience conscious awareness (Davis et al., 2008).

My study was structured along the lines proposed by Light (2008), that is, with a view to adopting “a more ecological, holistic view of learning that challenges the dualistic division of mind from body, learner from learned, and subject from object” (p. 23). The IG unit was developed to incorporate aspects of social constructivism and complexity thinking, intentionally moving away from correspondence theories of learning. Students were encouraged to share ideas in a student-centred environment to create a game while working in small groups.

The following section will provide a detailed analysis of complexity thinking. I will discuss the way in which the major components of this theory of learning—complex systems, emergence, and adaptation—relate to my study.

### 2.2 Background to complexity theory

Traditionally, complexity theory (CT) developed in the fields of physics, biology, chemistry, and economics (Hopper, 2011). Mason (2008) describes complexity theory in terms of a dynamic system where diverse elements, interacting in a particular environment, show emergent “properties and behaviours, which are not necessarily contained in the essence of the constituent elements or able to be predicted from a knowledge of initial conditions” (p. 35). The IG unit that was examined for this study was structured using a complexity lens to encourage emergent properties and behaviours from the students.

Davis and Sumara (2006) note that complexity thinking allows learning to take place in a living, social system. Similarly, complexity theory provides a more dynamic interpretative process for understanding learning as something that emerges from experiences, which transform learners. As students within the focus group for this study created their game, new ideas emerged from individual students within the group, which in turn allowed the game to
evolve in more dynamic and engaging ways. The next section will illustrate the features of a complex system, and will describe the presence of these features in the IG unit.

2.2.1 Complex systems

Mason (2008) proposes that complexity generally exists in situations where a number of agents are connected and interacting with each other in dynamic ways. An agent is essentially “something that takes part in an interaction of a system and is itself subsequently changed” (Ovens, Hopper, & Butler, 2013, p. 4). For the purposes of this study, the agent is the student participant in the IG unit. A complex system forms when the agents within the system are attracted to a particular activity of the system (Ovens et al., 2013). In this study, a number of agents (PE students) interacted with each other in a dynamic way to invent a game in a small group while being “attracted” by the common goal of inventing a territorial game. In so doing, the group, and each individual agent within the group, was “situated between order and disorder…as complex systems are neither predictable nor regular in the way they act” (Ovens et al., 2013, p. 4). As students worked through the unit to create their game, they “sometimes displayed highly-patterned and ordered features while simultaneously being surprising and unpredictable” (Mason, 2008, p. 43).

Complex systems operate differently from both simple systems and complicated systems. While simple and complicated systems are similar to complex systems, in the sense that they are composed of multiple components, they are nonetheless essentially “closed systems capable of decomposing to their individual parts” (Ovens et al., 2013, p. 4). Traditionally, scientific thinking was prone to characterizing systems as an assemblage of component parts, where the sum of the parts served to create the whole. In this context, components within a complicated system are seen as inert rather than dynamic and adaptive. Simple and complicated systems are understood as having the ability to behave in predictable ways, and are conceptualized as having a mechanical character.

On the other hand, complex systems are theorized as a whole that exceeds the sum of its parts, as unpredictable and adaptive, as non-linear and fluid. They make use of complexity
thinking, in which learning emerges out of dynamic interactions of the component parts. Learning, in turn, shapes the way the system adapts. According to Ovens et al. (2013), complex systems are self-organizing, adaptive, and constituted through numerous nonlinear, dynamic interactions (p. 4). Here, individual components are themselves self-organizing adaptive agents while remaining interdependent.

This study was structured to give students the opportunity to work in small groups—groups which functioned essentially as complex adaptive systems in the sense that each group had to continuously adapt their game to the different abilities of individuals within the group. Each individual agent, or student within the group, can be seen to represent a “complex adaptive system” in its own right, one that could offer a variety of ideas to the group, in turn prompting an adaption of the game in conjunction with other agents within the group. The unit was organized to allow for these diverse ideas to emerge in order to create a game that was engaging for all students within the group. In essence, in a complex system—such as a PE class engaging in an IG unit—the ensuing interactions, and the products of the interconnecting parts, served to enable individual learning where skills and knowledge were adapted and reformed, emerge in a way entirely unique to the system (Hopper, 2012).

Having described the key components of a complex system, I will proceed to examine the relationship between emergence and complexity thinking in the following section.

2.2.2 Emergence

One of the most important aspects of complexity thinking is that of emergence where, given a sufficient degree of complexity in a particular environment, new and often unexpected properties emerge (Mason, 2008). These unexpected properties are essentially new, in as much as they would not have previously been observed within the system, nor could their appearance have been predicted, as Mason (2008) observes, “from an analysis of the individual system components” (p. 43). In this way, a complex system becomes “more intelligent than the smartest of its members and it also presents occasions for all of the
participants to be smarter—that is, to be capable of actions, interpretations and conclusions that they wouldn’t typically achieve on their own” (Davis & Sumara, 2006, p. 192).

The structure of the IG unit enabled students, first of all, to share their ideas about creating a game. The hope was that, by creating an environment where students could express their ideas, new and unexpected properties would emerge. However, both the Principal Investigator of the larger study, and myself, the teacher-researcher, needed to place constraints on the system in order to, as Ennis (1992) noted, allow the teachers to set up learning conditions in an attempt to shape a system that would promote emergent learning for the students.

These following constraints were set out: (a) the game had to be inclusive, both in the game-design process and during game-play; (b) the game had to be safe; (c) the game had to be enjoyable for all participants; and, (d) the game had to flow. This study centred on the principle of inclusivity and, to achieve this, each group was required to come up with a decision-making policy to take this into account. This process can be seen as a constraint on the system. Ovens et al. (2013) emphasize that complexity thinking “foregrounds a contextual ontology where phenomena such as learning…are emergent in response to how contributing agents, as part of a collective, adapt and self-organize in relation to the constraints of a task” (p. 6). I will expand on the concept and process of adaptation and self-organization within complex systems in the following section.

2.2.3 Adaptation

Ovens et al. (2013) define adaptation as the “ability of complex unities to continuously and actively re-orient their structures in order to maintain coherence in relation to their worlds” (p. 7). In order to create new and emergent possibilities, in the interest of survival, complex systems must have the ability to self-organize and adapt to changing environments. The process of adaptation offers an insight into the way in which complex systems learn, and Ovens et al. propose that we can see this process of adaptation “as an analogy for how we can understand human learning” (p. 7).
By viewing the focus group as a complex adaptive system (detailed below), and exploring the students’ lived experiences as they engaged in an IG unit, we were able to examine how the focus group continually adapted their game in relation to the constraints that were put forward by the teacher. Each group contained “enough diversity in its make-up to allow it the ability to adapt to the demands of the environment as well as each group contained enough redundancy (commonality) between the agents…so that if any part of the system fails, the other agents of the system can compensate” (Hopper, 2012, p. 85). The conditions of the environment need to offer “enabling constraints (affordances) that limit what the system can do, preventing it from being overwhelmed, but, at the same time, offering an openness to possibilities of which the complex system can take advantage” (Ovens et al., 2013, p. 7).

As noted above, the “enabling constraints” for this study focused on giving all the student within the focus group the opportunity to express their ideas in the process of designing the game. Davis and Sumara (2006) note that “in order for diversity to become useful within a collective, it must be able to be represented and those representations must become used within the context of events of learning” (p. 46). The decision-making policy, with its emphasis on inclusivity, functioned as an enabling constraint which allowed diversity to emerge within the focus group by encouraging all students to express their ideas. This, in turn, shaped the game to adapt to the individual ability levels of the group members.

In the following section I will highlight the importance of small group problem-based learning to the IG process. I will then elaborate on the way in which the IG focus group can be seen to express the traits of small group problem-based learning. Finally, I will illustrate how the IG focus group can be considered as a complex adaptive system.

2.3 Small groups and IG

The goal of this study was to enable students to express their social experiences as they engaged in small groups to create their own game. IG pedagogy depends on structuring the class into small groups in order to encourage social interaction. As with the other aspects of this unit, these groups were structured using a complexity lens in order to approximate the
conditions of complex emergence. Davis et al. (2008) point out that within these small
groups, “agents might come together to give rise to more complex, robust, capable wholes”
(p. 192). The following section will address small group problem-based learning and how it
relates to IG.

2.3.1 Small group problem-based learning in IG

Mennin (2007) defines small group problem-based learning as “a method of learning in
which students first encounter a problem followed by a systematic inquiry and reflection
process” (p. 305). The IG process enhances group learning as students are challenged with
the “problem” of creating a game within the constraints placed on them. Students are
expected to design their game and use their decision-making policy to revise and reflect on
the progress they have made. During this period of collaboration in the process of inventing
their game, “students activate and explore their pre-existing knowledge using a systematic
process of discussion and exchange in the context of the problem” (Mennin, 2007, p. 306). In
this way, during the process of discussion and exchange, students gain social experiences
and develop social and interpersonal skills in authentic situations. IG encourages students to be
creative while at the same time developing a game that incorporates the ability levels of all
the members of the group. This process generates a learning situation where each group is
“studying the same problem but creating different yet similar learning issues” (Mennin, 2007,
p. 307).

Having established that the IG unit shares important traits with small group problem-based
learning, I will propose that IG groups can be seen as complex adaptive systems which can
reflect adaptive, self-organizing, emergent behaviour.

2.3.2 The IG focus group as a complex adaptive system

I propose that a group functioning within the IG process operates as complex adaptive
system. It is complex in the sense that learning in this context is not predictable, or linear, nor
can it be explained by way of simple rational models. The group is adaptive in as much as the
participants, as individuals and as a group, are altered by, and learn from, their experiences. According to the terms Mennin sets out (2007), the group qualifies as a complex system because it consists of a set of connected or interdependent people or things.

2.3.2.1 Agents within the group

Each agent within a complex adaptive system is, in itself, also considered to be a complex adaptive system because, as Mennin (2007) notes, “they all experience interactions among diverse agents, internally and externally….as [t]he group is embedded in society and is affected by society” (p. 310). Agents differ from each other on the basis of their background and their varying capability for exchanging information with each other and with their environment. Each agent has different information about their system and no single agent has enough information to understand the system in its entirety (McDaniel & Driebe, 2001).

Within the IG process, students from diverse backgrounds, with different athletic abilities and different experiences with PE, came together to create a game. Consequently, it would be expected that they will have different ideas about the game, and Mennin (2007) emphasizes that this “exchange of differences among agents under particular conditions is what leads to self-organization” (p. 311).

2.3.2.2 Self-organization

Students are encouraged to work collaboratively through the IG process in order to create their game. This serves to include all members of the group in the process and stimulates social interaction among the group members. As Mennin (2007) notes, “it is the dynamic interaction between agents (group members) that leads to emergence” (p. 312); and further, that “individuals and the group arrive at a new understanding collectively (self-organization) through discussion, exchange of ideas, dialogue, debate and sharing of information…there is no self in self-organization” (p. 311).

The IG focus group can be viewed as a complex adaptive system on the basis of these criteria: first, that learning is not predictable; second, that the participants, as individuals and
as a group, are altered by, and learn from their experiences; and third, that they form of a set of connected and interdependent agents. This study was structured in such a way as to encourage students to express their ideas about the development of their game within small groups, and it was anticipated that, by doing so, new and unexpected properties would emerge.

In this outline of the major tenets of complexity thinking, it remains now to highlight the conditions that need to be present in order for a complex learning system to form. I will also describe, in the following section, how these features were present both in my study and in the larger study.

2.4 Features of a complex system as it emerges in the IG unit

Complexity thinking requires that certain features or conditions must be present for a complex learning system to emerge. These conditions have been identified in the course of research over several decades as studies examine diverse settings, such as those provided by classrooms, anthills, and the development (and enactment) of international trade agreements (Kelly, 1994). My position, developed in this literature review, is that the IG focus group can be understood as a complex unity—that is, as an adaptive, self-organizing system.

It remains now to interpret the IG unit in terms of necessary conditions that need to be present for complex emergence. I was first introduced to the key concepts that underlie the conditions of complex emergence in the process of collaborating with other teacher-researchers involved in the larger study. It was through this collaboration with my peers, and through facilitation of the principal investigator of the larger study, that I began to understand how the conditions of complex emergence would help to structure the IG unit. The following conditions are those specific to a complex system, and how I will describe how these have been woven into the IG unit.
2.4.1 Enabling constraints—opening possibilities by limiting choices

As noted by Davis et al. (2008), a key condition that needs to be present in order for a complex system to form is that of “enabling constraints.” This means that the constraints placed on agents within the system are opening themselves to possibilities even though their choices have been limited. These constraints are not seen to be prescriptive; rather, they are seen to be expansive, in the sense of opening possibilities for what might be done by indicating what must not be done (Davis et al., 2008). Teachers must “balance between sufficient randomness to allow for flexible and varied response[s] and sufficient organization to channel such responses into coherent collective activity” (Davis & Sumara, 2006, p. 49).

Games are an example of enabling constraints which produce emergent possibilities that are always original and unique, but which are also always dependent upon a set of conditioning rules/constraints. Within the IG unit students are required work together to create rules for their game. The game evolves as students explore the rules by playing the game, and by way of group- and self-reflection. As students play their games within their groups, and test their invented rules, “learners discuss ways in which the constraints (rules) they have negotiated might be developed or modified to make the game more inclusive and enjoyable (more enabling) for all participants” (Butler & Robson, 2013, p. 108).

Students were given constraints with the hope that these constraints would open up emergent possibilities. As a teacher-researcher involved in the larger study, I incorporated the constraints of this research into my study. The focal point for this study was the examination of the social dimensions of game invention—specifically to highlight the constraint that dealt with inclusivity during the game construction process. This constraint required all IG groups to “invent” an inclusive decision-making model that contained the following conditions (as set out by Butler, in press): (a) the group could not decide upon rules without establishing a group protocol for making group decisions that is fair, equitable, and speedy; (b) no one could be excluded from discussion, although individuals were not required to contribute; (c) rules could not be imposed by just one member of the group, and (d) all rules could be
refined or removed at a later time (Butler, in press). These were the enabling constraints that all teachers in the larger study used as they taught their IG unit.

I came to understand the impact of these enabling constraints in the process of applying both “game design and game-play in IG in order to harness the educational potential of games education in the ethical dimension” (Butler, in press). These teacher-led enabling constraints offered the system new possibilities by challenging the system to make creative adaptations. These constraints are also seen as “a precondition for learning, in that they disturb (or perturb) the status quo and invite the system to adapt, while preventing it from spiraling into chaos” (Butler & Robson, 2013, p. 109).

The next condition of complex emergence to be discussed is the importance of internal diversity within the complex system.

2.4.2 Internal diversity

In order for a complex system to adapt there must be enough internal diversity among the agents of the system to prompt the system to respond innovatively to novel circumstances. In other words, the intelligence of a complex system is tied to the diversity of the system. Davis and Sumara (2006) note that “in complexity thinking [internal diversity] can be thought of as an asset because one of the most important features of collective intelligence is the presence of diversity represented among the agents that comprise the system” (p. 46).

For my study, a high degree of diversity was present within the focus group; individuals had different experiences with game-playing, varied in their athletic ability, and came from different cultural backgrounds. The grouping strategy used in the study (explained in the methods section) ensured that each group within the class would include a degree of diversity because “the collective’s range of intellectual possibility depends on variation of the experiences and perceptions of its members” (Davis & Sumara, 2006, p.43). The hope was that, as Hopper (2012) points out, “the diversity within [the focus] group would be an asset; as the game will become more dynamic and engaging if it is designed to accommodate all
ability levels and different prior understandings of games within the game category” (p. 84). Within this game-design process students were encouraged, by way of the inclusive decision-making policy (i.e., the enabling constraint), to express diverse opinions and ideas, anticipating that this would make the game more dynamic and engaging. The key point here is that, without this teacher-led enabling constraint, the inherent diversity might not have had the chance to be expressed.

Having illustrated how enabling constraints and internal diversity are necessary conditions for complex emergence, I will move on to highlight how neighbourly interactions add to the conditions required for a complex system to yield new properties or behaviours.

### 2.4.3 Neighbourly interactions

For complex possibilities to emerge there must be something that Davis and Sumara (2006) describe as a “neighbourly interaction” amongst the agents. They explain it this way: “What constitutes a “neighbour” within the context of shared processes of creating and symbolizing ideas is not necessarily physical bodies or social groupings…the most significant “neighbours” in a knowledge-generating collective are ideas, hunches, queries, construals and other manners of representation” (p. 43). In this setting, knowledge emerges not simply amid the juxtaposition of bodies, but amid the juxtaposition of interpretive possibilities. In other words, the neighbours in a knowledge-generating collective must be ideas (Davis et al., 2008).

Davis et al., (2008) go on to point out that, “in order for the system to be productive, there must be a structural imperative for the maintaining of coherence of the system, as the teacher must create an environment where these ideas can bump together” (p. 199). The idea is that new interpretive possibilities will emerge when these neighbours are allowed to “bump together.” In the IG study students followed their decision-making policy of inclusivity, which in turn provided the structure to allow their ideas to bump together. Students were also required, as a group, to complete the IG planning sheet, giving them an additional structure
within which to create their game, and allowing them keep track of different ideas by writing them down.

2.4.4 Decentralized control

As students engage in the process of inventing their game, an important dynamic can be seen to be at work: No one individual was “in charge” of the group as it organized itself around the assigned work (Davis & Sumara, 2006). An important component of complexity thinking is the question of control and the extent to which it is shared in a complex system. Davis et al. (2008) emphasize that it is not a matter of “maintaining control or relinquishing control but, rather, in dispersing or distributing control across the network of relationships in the classroom” (p. 44). Control, in so far as distinctions between teacher- or learner-centredness are not very useful for making sense of these shared projects, in large part because the phenomenon at the “centre” of these projects is not a teacher or student. Rather, as Davis and Sumara (2006) note, “the experience of insight around a matter of shared interest…what becomes “authoritative” in such a setting does not reside in any particular individual, idea, or resource…instead, authority is more distributed across individuals, ideas and resources” (p. 45).

The IG unit was neither teacher-centred nor learner-centred; it was centred, or based on, an emerging possibility, or the interaction of neighbouring ideas emerging from a decentralized interactive structure. In the course of the developing the unit, students used their prior experiences to put forward ideas for their game, usually in the form of rules and regulations; the teacher-researcher relinquished control in order to allow groups to creatively develop their game within the structure provided.

As with neighbourly interactions, a complex system is also subject to modification through a variety of feedback loops. I will describe this feedback cycle as another condition of complex emergence in the following section.
2.4.5 Feedback loops—positive and negative

Davis et al. (2008) remind us that a complex learning system is modified by a variety of feedback loops that amplify (positive) or dampen (negative) the actions of a system. In an IG lesson, feedback loops come about through encouraging exploration, demonstrations that focus attention on key ideas, and reminding the students about safety measures and appropriate behaviour. An example of a feedback loop emerged in the course of a games showcase during session four (halfway through the unit), where students used the feedback from other groups to help develop their game. This showcase provided feedback to both of the groups presenting their game, as well as to the group playing the game during the showcase.

The final condition for complex emergence, along with the conditions set out above, is that of collective memory, which I will discuss in the following section.

2.4.6 Collective memory—creating memories by remembering and forgetting

A complex system, one that learns from experience, must have the ability to select and preserve memories (Davis et al., 2008). Obviously, a system cannot remember everything, but it must have the ability to recall events and details; it must have the ability to embody its history (Davis & Sumara, 2006). In the IG unit, this was achieved by having the students write down rules and changes to the rules (by having them trial the rules during the game). As the unit progressed they were then able to remember and keep track of what worked and what did not work, which in turn fed back into the development of their game.

This completes my review of the theoretical framework underpinning complexity thinking, a central aspect of my study. In the following section, I will discuss the way in which complexity thinking, and the conditions under which it emerges, relate to the teaching of physical education, particularly to the process of inventing games.
2.5 Complexity thinking, physical education and inventing games

In this section, I will review the literature that reviews the use of a complexity thinking in the field of PE. First, I will focus on the literature which deals with the different components of complexity thinking as these apply to the teaching of PE; and, second, I will highlight studies that have specifically dealt with IG and complexity thinking. In this way, I will relate my study to the wider field of inquiry.

Hopper (2011), in his work on game-play, uses the method of autobiography as a way of linking his childhood memories of inventing games with his father to teaching games later in his life in his role as a PE teacher. His reflections inspired me to think back on my own childhood experiences of playing games in the backyard with my younger brother, and prompted me to relate these memories to the experiences of my students in the course of the IG unit. Hopper uses his own stories to provide a personal window on his research, in this way inviting his readers to think about their own memories of playing games as children; he draws on his recollections to identify the elements of complex learning systems which he applies to teaching physical education through game invention; and, he uses his narrative to highlight the conditions of complex emergence that were present, both when playing games as a child, and when using game-playing in his PE classes. He specifies the conditions of complex emergence as follows: internal diversity, feedback loops, enabling constraints, decentralized control, and neighbourly interactions. He found that, when these conditions were present in his PE lessons, a complex adaptive learning system emerged in the classroom. Hopper’s work has not only provided me with the tools to link theory to my teaching practice, but his analysis has also enabled me to understand how the conditions of complex emergence were applicable to my study.

Butler and Storey (2013) emphasize the importance of an open system when attempting to relate complexity thinking to learning to play (and invent) games within a PE setting: “A key concept in complexity thinking is that of open systems, which lie in contrast to the closed and predictable systems. In the case of games, the play between players cannot be characterized as closed or simple because there is a constant re-organization of player relationships
occurring” (p. 135). They note that the events and adaptations that occur in complex learning system, such as games, are probable but cannot be predetermined through a process of design. Davis and Sumara (2003) point out that the variance in learning during a game is due to the fact that “members of the same class of phenomenon have the capacity to respond differently to the same sorts of influences,” and that “complex systems embody their own histories” (p. 125).

Butler and Storey (2013) set out the features of games in terms of complex adaptive systems in the following way: (a) games are comprised of co-dependent agents; (b) games allows for self-organization between players; (c) games are designed for equilibrium, and are open to disturbance; (d) games represents a site of nested and co-emergent learning; (e) players have varying experiences or interpretations of time during play; and, (f) game structure evolves (p. 136). The Butler and Storey study was primarily concerned with game-play, whereas my study highlighted the social aspects of the game-design process. Nonetheless, Butler and Storey provided me with useful reference points because they clearly established, first, that games can be seen in terms of complex adaptive systems and, second, that games represent sites of co-emergent learning.

Hopper (2013) describes a teacher education approach known as “student integrated teacher education” (SITE), which is essentially a program, or a classroom course, that creates the conditions for learning how to teach. This program allows students “through continued participation in a school culture” to “gradually take responsibility for teaching episodes within a lesson” as they “continually reflect on shared experiences from a school context through systematic observation, active participation and joint reflection on practice” (p. 12). Hopper interprets the experiences of the SITE students using a complexity lens where the “course created the conditions for learning to be framed as an emergent interplay of what the person brings to the situation as they engage in the challenges of the tasks and the outcomes of these interactions” (p. 1). He outlines the key features of the complex learning system as it emerged in the classroom. The key features that he examines include: enabling constraints, feedback loops, creating and forgetting memories, decentralized control through neighbourly
interactions, and internal diversity among the agents. Hopper concludes that “complexity thinking as demonstrated in the SITE course encourages us to frame teaching as creating the conditions for learning as an occasion where the unexpected comes together” (p. 10).

My study (and the larger study within which my study is framed) incorporates the conditions of complex emergence that Hopper (2013) uses in the SITE course. Conditions such as enabling constraints, neighbourly interactions, and internal diversity are employed to create an environment that encourages emergent learning to occur. All of these conditions operated in a decentralized structure which allowed for ideas to emerge that lead to the creation of a unique game.

Hopper (2012) uses examples to discuss how pedagogical approaches associated with creative dance and inventing games can form complex learning systems that can be understood using complexity thinking. Hopper outlines the different learning theories, highlights the difference between coherence and correspondence theories and explains how complexity thinking fits in with these theories. He gives examples of the ways in which complexity thinking can be applied to physical education, and illustrates the presence of the conditions of complex emergence in both a creative dance unit and an IG unit. Of interest to this study are the features outlined by Hopper (2012) which need to be present in order for a complex learning system to form. These conditions include enabling constraints, diversity and redundancy within a group, neighbourly interactions through decentralized control, and creating and forgetting memories—all of which were found to be present in a creative dance and IG lesson.

All the research that I have reviewed to this point acknowledges how complexity thinking, or the conditions of complex emergence, can be established in a PE setting. In the following section, I will look at two studies that involved the process of IG, both conducted by Butler (2007, and in press), and structured around the conditions of complex emergence, specifically with respect to enabling constraints.
Butler conducted a study in 2007 to explore IG as a medium for prompting ethical behaviour. She investigated how complexity thinking might emerge from IG. Butler and Robson (2013) propose that “as we consider learning through the lens of complex adaptive systems operating within enabling constraints, such outcomes may be better served and more easily observed” (p. 112). In Butler’s 2007 study, separate groups were analyzed—a group of experienced game players and a group of less experienced game players. The findings showed that each group invented a game that matched their ability levels: The experienced group invented a game that was fast-moving, where players had to make quick decisions; and the less experienced group constructed a game that allowed more time for decision making by way of “team huddles” where tactics were discussed. The less experienced players also included rules, for example where defenders were only allowed to the halfway line, and no one was allowed into the goalie’s semi-circle. These rules ensured that each player in the less experienced group would have a chance of success within the game-play session.

Of greater relevance to the study at hand, Butler and Robson (2013) also found that each group made different decisions within the game design process. In their study, the experienced group, especially the boys within the group, were eager to engage in active game-play, preferring to keep discussion to a minimum. Consequently, there was little discussion about rule changes, or about the game in general, and this limited the opportunity for cooperation within the group. Additionally, they found that a rift occurred between the boys and the girls within the group because the boys did not want to take the time to discuss the rules, and after a time the girls began to work on their own. This outcome differed significantly from the process of the less experienced group which appointed a leader, worked cooperatively, and shared ideas, and where the players listened to each other without interrupting too frequently. This group also made decisions by creating a unique system of voting which afforded anonymity to the voter.

Butler and Robson’s study (2013) has significant relevance to my study for several reasons: It used a complexity lens to structure an IG unit; it used small groups to invent a game; and, it focused on the social interactions within the game-design process. My study differed from
that of Butler and Robson’s in two respects: First, I did not separate the groups on the basis of experienced and less experienced individuals; I intentionally selected groups that specifically had a mix of different abilities and backgrounds. And second, my study participants were selected from a class comprised only of boys. I will outline below the nature of the tension that occurred between the more experienced and the less experienced individuals within the groups.

As I have noted, my study was framed within a wider study conducted by Dr. Joy Butler in conjunction with six other teacher-researchers across the province. The goal of the larger study was to “identify ‘skills and dispositions’ that are commonly referred to in the rhetoric around democratic citizenship and that are also applicable to ‘successful’ game-play (games that flow, and that are fair and engaging)” (Butler, in press). These skills and dispositions include communal fairness, decision-making, personal and social responsibility and negotiation. More specifically, the goal of Butler’s study was to “follow the processes, dynamics, and insights of students and teachers engaged in Inventing Games (IG), paying particular attention to the interactive structures that arise.”

This study found initially that, as students engaged in the process of inventing their games, issues of social justice became an important focus for both teachers and students. For example, issues that had to do with who was able to have input into the game-design process, along with issues that had to do with team-selection, were identified as social justice issues that could be addressed during the study. The study also addressed the way in which enabling constraints were to be used by teachers and students in the creation of the games. For example, a teacher-led enabling constraint determined that each group create a democratic decision-making policy. The constraint ensured that the game would not be created by one or two group members, and thereby enabled all students within the group to propose ideas for the game. Butler found, interestingly, that students showed “an almost uncanny knack of choosing constraints that are not only developmentally appropriate and suited to their current level of skill, but also serve to draw attention to their social, physical, and affective needs” (Butler, in press).
The study I undertook for the purpose of this research was based on the wider study: The structure of the unit was carefully planned using the complexity lens developed by the principal investigator and the teacher-researchers.

In summary, I have outlined above the essential components of complexity thinking as they are represented in the relevant literature reviewed here. By identifying the basic characteristics of a complex system, I have set out the way in which individual groups within the IG study can be seen in terms of a complex system. By way of contrast, the differences between complex, complicated, and simple systems were outlined. I addressed the issue of emergence and the way in which it relates to agents (students) as they continually self-organize and adapt to changing circumstances. It is important to emphasize that a complex system learns by adapting to changing environmental constraints, and it thus presents a useful analogy for how humans learn. In this context, I was able to clarify how the IG focus group for this study fits the analogy, and can therefore be usefully understood in terms of a complex adaptive system.

By way of elaboration, I have highlighted the conditions of complex emergence that were present in the IG unit. These conditions included teacher-led enabling constraints, such as a decision-making policy that required inclusivity, a constraint with allowed the internal diversity within the group to be accommodated The condition of neighbourly interactions was identified, a condition that encourages ideas to “bump together,” thereby enabling students to create a game that was unique, inclusive and engaging. Students created feedback loops, another condition of complex emergence, in order to modify their games; they tracked their changes by writing down their ideas as the unit progressed so they could recall what worked and what did not work. In order to place my study in the context of the emergence of complex adaptive system, I examined research that sought to apply a complexity lens specifically to PE and IG. I identified two specific studies, both by Butler (2007; in press), which examined how the process of inventing of games in a teaching context can usefully employ enabling constraints to help students create their games, both in game-play and game-design.
In the first part of this literature review I set out the major learning theories and outlined their assumptions. I followed this with review of the literature dealing with complexity thinking—the theoretical framework for this study—and the way in which the literature examines complexity thinking in the context of physical education and the process of inventing games. The following section of this literature review will focus on the research that is most closely related to the principal aspects of my study. These include (a) student centred curriculum models in PE, (b) IG, or any related process that involves students creating their own game in the context of a curriculum model, and (c) studies that have explored students’ experiences.

2.5.1 Student-centred curriculum models in PE

Kirk (2010) identifies the models-based approach to physical education as one where both the subject matter of the curriculum and the teaching strategies are brought into alignment with distinctive learning outcomes in order to create a design specification for the creation of school and district level programs. The models-based approach is based primarily on “student-centred strategies such as peer and reciprocal teaching and problem-solving” (Kirk, 2010, p. 125). According to Kirk, this approach offers two major benefits to PE. First, it “provides a means for physical education to pursue the wide range of legitimate physical, cognitive and social goals,” And secondly, he proposes that, “by aligning learning outcomes with relevant subject matter and teaching strategies, there is a strong chance that these learning outcomes might be achieved by a majority, if not all, students” (p. 126). This study employs a similar models-based approach for the IG unit—specifically using a TGfU model—although aspects from Sport Education (SE) and Cooperative Learning (CL) are incorporated into the IG unit (discussed below).

According to Butler (2009), the IG process, “is an extension of the Teaching Games for Understanding (TGfU) curriculum model, a model designed to provide a student-centred environment within the context of PE” (p. 3). Butler notes that “TGfU is a game- and learner-centred model to learning games” (p. 3). The original six-step TGfU model, coupled with four fundamental pedagogical principles (sampling, representation, exaggeration, and tactical complexity), was presented as a curriculum model for developing decision-making and skill.
performance in games (Thorpe, Bunker, & Almond, 1986). Components of SE, a model used to “develop competent, literate and enthusiastic sportspersons” (Siedentop, 1994, p. 35), and CL, a model where “each student becomes a meaningful participant in learning…working in small, structured, heterogeneous groups to master the content” (Dyson, Griffin & Hastie, 2004, p. 235), are used in the IG process as it works to bring all three of these instructional models together. More specifically, IG can be seen to incorporate aspects of SE because, during the game-design process, students are able to share different roles such as the assistant coach and referee, both of which are features of the SE model. SE assigns students within small groups to non-playing administrative roles, and IG uses this concept as well. The IG process integrates components of CL as students work in small groups to complete a task as each student within the group is dependent on one another.

IG shares some pedagogical principles with CL, SE and TGfU. First, all of these models advocate a student-centred approach where learning takes place in a participation framework (Lave & Wenger, 1991). Second, learning activities have the potential to include social, physical, and cognitive learning outcomes. Third, students work in small groups and rely on each other to complete the activity. Fourth, the teacher facilitates learning and shifts responsibility to students through learning activities. SE, TGfU and CL emphasize active learning within a social practice and involve the processes of decision-making, social interaction, and cognitive understanding of various physical activities. All four of these components feature heavily in the IG unit given that IG creates a student-centred environment which focuses on all three learning domains when students are working in small group settings.

A number of studies have examined the student-centered curricular approaches discussed above (TGfU, SE and CL) in the context of PE (Rink & Werner, 1993; Light 2005 Griffin, Brooker, and Patton 2005). Rink and Werner (1993) note that research on TGfU has reported positive learning outcomes for students. The most significant finding that emerged from their review was that students who were taught from a TGfU perspective tended to perform better on tests of tactical knowledge than those taught from a technique-led
perspective. Griffin, Brooker, and Patton (2005) indicate that a TGfU approach may be perceived by students as more enjoyable than the technique-led approach, which could explain the increase in their motivation to participate.

Light (2003) reported similar observations, where students not only saw the TGfU unit as inclusive, social, and enjoyable, but claimed that, while their skills did not improve remarkably, their increased understanding of the game contributed to their sense of accomplishment and enjoyment. Harvey, Wegis, Beets, and Bryan (2009) reported that implementing the TGfU model in a handball unit for grade six students offered “significant changes in student perception of learning and effort regardless of skill level” (p. 111) Similarly, Light and Tan (2006) expand on this theme in their examination of the impact of cultural differences on learning—and on the way in which teachers have to adjust their teaching style to accommodate these differences. The Light and Tan study looked at the way in which Australian students from different cultural backgrounds responded to PE, and found that the Teaching Games for Understanding model enhanced their self-confidence as participants, and increased their regard for sports overall. Again, students conveyed a positive impression of TGfU because it fostered inclusion, understanding, learning through social interaction, and promoted an overall sense of accomplishment and enjoyment.

Light and Fawns (2003) examined the utility of TGfU for integrating speech and action in small groups of Physical Education Teacher Education (PETE) generalist elementary students. They found that the nature of the social interactions offered the means for teachers to enhance students’ total experiences of games. These PETE students, who had varying degrees of PE knowledge, felt that TGfU increased their depth engagement and provided for positive emotional experiences. Light (2002), looking at pre-service generalist elementary teachers, found that the TGfU approach, with its reduced demand on skill level, and its increased emphasis on social interaction, made PE more enjoyable. Light also found that the students in his study enjoyed the social interactions within the small group setting because they were able to establish solutions to tactical problems without teacher pressure.
The literature reviewed above establishes that IG incorporates aspects of different student-centred models in PE, including CL, SE and TGfU. In the next section, I will explore the existing literature on IG and other models that have enabled students to create their own games in PE.

2.5.2 Inventing Games

The focus of this section of the literature review is to give an outline of the major literature that exists around IG and relate it to my study. In addition, I will describe the common themes and findings and identify some the significant gaps and limitations in the literature. Finally, this review will focus on those studies that address the benefits of IG, as well as the social aspects of IG, and will conclude with studies that address student learning in an IG unit.

The process of encouraging students to create their own games in physical education classes has been variously identified in the literature as “games-making” (Almond 1986), “child-designed games” (Rovegno and Bandhauer, 1994), “games invention” (Curtner-Smith, 1996), and “student-designed games” (Hastie, 2010). Despite the different terms given to this process, they all describe a common theme: providing students with different levels of freedom to create their own games in small groups. In his book, Student Designed Games (2010) Hastie defines this process as one where “students create, organize, implement, practice and refine their own games within certain limitations presented by the teacher” (p. 3). Butler (2006) identifies this process as Inventing Games (IG), a term preferred for the purpose of my study. IG gives students the opportunity to create a novel game within a group setting that “supports the development and awareness of principles of ethical actions as they become manifest in situated and collaborative learning contexts” (Butler, 2006, p. 185).

The first significant discussion concerning the process of inventing games appears in a work entitled Games Teaching: A New Approach for the Primary School, by Mauldon and Redfern (1969). The authors propose that
to be involved in a game, to decide on the rules and to find answers to problems that arise to play a mutually designed game over which children felt ownership was more valuable than playing prefabricated games. These [experiences]…challenge students to use their inventiveness and creativity. (p. 17)

Mauldon and Redfern (1969) appear to be the first to recognize that students who designed their own rules would become more successful in game-play. Almond (1986) reiterated some of the benefits outlined by Mauldon and Redfern (1969), reporting that IG allowed students to find out for themselves why rules were important, and emphasizing that students would feel a sense of accomplishment as well as a sense of ownership over a game they created. Almond also appears to outline for the first time the way in which IG can be implemented by setting out for students the various components of a game (rules, scoring systems, etc.). Almond highlights for me some of the focal points for my own study, particularly the way in which IG focuses on the social domain, requiring students to work together to create their game using cooperation and communication skills.

Ellis (1986) describes how to conduct an IG unit, and provides insight on the process of increasing freedom with older students. Smith (1991) was one of the first educators to locate IG within the Teaching Games for Understanding (TGfU) model. He proposed that teachers could use IG within the TGfU model to help increase a student’s understanding of the impact of rules on game-play. Significantly, Smith incorporated the games categories set out by Thorpe, Bunker and Almond (1986), an innovation that would be used in future IG research. Smith (1991) encouraged students to invent games in each of the categories—target, fielding, net and wall, and invasion—in order to observe what transfer effects might occur. The IG process designed for this study was based on this same idea of having the students incorporate games categories in the process of creating their games.

I will now refer to the literature that looks at the way IG addresses the three learning domains, psychomotor, cognitive, and affective/social.
The Rovegno and Kirk (1995) examined the “potential for IG to act as a vehicle for socially critical physical education” (p. 465). This literature highlights how the IG process can provide students with the opportunity to address and acknowledge social issues that may arise during the game-design process. The authors provide the following reasons as to why IG has the potential to be a vehicle for socially critical PE: (a) The game forms can be developed in ways that do not privilege particular body types; (b) although the focus of the lesson or unit is teacher-determined, children are given considerable control over the nature of their games and, in turn, the way they explore and practice this core content; and, (c) these lessons help children learn to make group decisions while attending (at their developmental level) to social justice, and to care and develop responsibility for themselves and others (Rovegno and Kirk, 1995).

Curtner-Smith (1996) proposes that IG can develop all three learning domains: psychomotor, cognitive, and social. Butler (2006) adds to the discussion, noting that IG can be used to promote the ideals of democracy in action. She notes that “teachers help learners to work together democratically, to share ideas and to value and honor everyone’s contributions” (p. 253). Butler’s research has direct relevance to my study, particularly her focus on the social processes of inventing a game that ensures that all group members are involved in the process (Butler 2013). Butler, Gomm, Russell, Siess and Sullivan (2009) undertook a study that looked at teacher candidate’s responses while teaching an IG unit. This was the first study to incorporate IG as a part of the teacher education curriculum, and the first to incorporate the teaching of democracy into the IG unit. This study supported previous claims that IG has the potential to develop students’ social domain, given its emphasis on arranging students in groups for the purpose of designing their games.

An important aspect of my study is the requirement that all group members be included in the game-design process. Hastie and Casey (2010) resolved this issue by applying the widely-used “jigsaw” method of organizing classroom activity to give every student an integral role in planning the game. The “jigsaw” method can be understood as a jigsaw puzzle, each piece—each student’s part—is essential for the completion and full understanding of the
final product. Students work in small groups to complete small tasks, and then they take that information back to their “home” group to share the information with the other members of their “home” group. If each student's part is essential, then each student is essential, and that is precisely what makes this strategy so effective. Giménez (2011) elaborated this process by giving specific roles to students in each group—similar to the Sport Education model. Butler (2013), in “Stages for Inventing Games,” explains that, within the IG process, “students establish their own system of making group decisions based on the principles of [inclusion]” (p. 50). All of these studies address the issue of inclusion within the game-design process, which is a central component of my study.

The following studies describe the ways in which technology can be incorporated into IG and discuss the consequent learning outcomes. Hastie, Casey, and Tarter (2010) incorporated technology into PE lessons through IG by using wiki tools to help students create games. In their study, each small group of students tracked the development of their game online using a wiki which enabled all students within the group, with the aid of the school librarian, to contribute ideas about rules and scoring systems. The researchers found that students were highly engaged and had a great deal of commitment to designing the game; they also found that the PE teacher and teacher-librarian were able to provide immediate feedback on the wiki, resulting in the students having better designed games.

Hastie and Casey and (2011) conducted a study to explore students’ experiences during an IG unit by using student interviews to document the various experiences that came out of creating a game. This study used group interviews to enable students to express their experiences as they created a game. They found that students responded positively to IG; that the students made an effort to include everyone in the process; that they chose to create innovative games; that they avoided requiring skills that could only be performed by a few (i.e., developmentally appropriate created games); and, that students enjoyed freedom of choice while creating their games. Casey, Hastie, and Rovegno (2011) also undertook a study to look at what students actually learned from the IG process. They also used interviews that encouraged students to highlight what they learned in the process of creating their own
games. The findings showed that there was a gain in the appreciation of games as students came to understand how rules affected the game, how rules and tactics were interconnected, and how the environment could have an impact on a game.

These two studies share common traits with my study in so far as they sought to enable students to disclose their experiences of creating a game in the context of the IG process, and they both used small-group learning to structure the unit. However, both studies focused primarily on the psychomotor and cognitive domains of student experience, while my study is primarily concerned with the social/affective domain. Additionally, both of these studies looked at the outcome, the actual game created by the students, while my study was primarily concerned with the social interactions that occurred in the game-design process. My study also emphasized the importance of giving each student a voice in the IG process. These two studies both interviewed the group as a whole, which likely would have left some of the less talkative students out of the interview process.

In this final section I will review studies that have examined student perspectives of their social experiences in the setting of physical education.

2.5.3 Social experiences from the student’s perspective

A major component of this study was to look at ways of enabling students to share their social experiences as they engaged in creating a game in small groups. Literature on students’ perspectives on their experiences is limited and, as Dyson (2006) points out, “the most widely used education research handbook, Graber (2001) does not refer to students’ perspectives as a line of inquiry” (Dyson, 2006, p. 326). Cothran and Ennis (1999) argue that the “lack of information about students’ perspectives greatly reduces physical educators’ ability to design intervention and reform efforts to increase student engagement” (p. 236). This study was intentionally designed to empower students to share their social experiences, and this has had an important impact on my teaching practice. For example, as I read through the student journals I gained an appreciation of the reasons why some students dislike PE, and why others feel excluded from the decision-making process, both within IG as well as in
other aspects of PE. This experience has informed my teaching style, and has enabled me to create a more inclusive learning environment.

Suomi, Collier, and Brown (2003) looked specifically at the social experiences of grade four elementary students in PE classes in order to identify the factors that affected their social experiences of physical education. The researchers noted that few PE studies have examined the social experiences of students in a PE setting, and they urged that further research give greater weight to students’ perspectives. Suomi et al. (2003) used qualitative data analysis to identify the factors that had a positive or negative affect on the social experiences of these children, and used individual student interviews as well as focus group interviews to document the student responses.

Suomi et al. (2003) asked the teachers to use a modified version of Hellison’s (2003) Teaching Personal and Social Responsibility (TPSR) model, where students are taught to take responsibility for their own behaviours and choices and, more important, where they are taught that they have a social responsibility to be sensitive to the rights and feelings of their peers. After analyzing the data, four factors were determined to have positively and negatively affected the students’ social experiences: (a) the PE teacher, (b) the social content of the activities, (c) the cultures that formed among students on the basis of their differences, and (d) the social skills of the students.

The first factor, the PE teacher, was analyzed in terms of three sub-themes (a) the teacher’s philosophy, (b) the teacher’s curriculum, and (c) the degree of caring exhibited by the teacher. The philosophy of the teachers included in this study was based on the principal that winning or losing was relatively unimportant, and that the goal of the teacher was essentially “to create a non-competitive environment in which students with a wide range of abilities could learn and enjoy movement” (Suomi et al., 2003, p.191). With respect to the curriculum, all the teachers in this study used the above-noted TPSR model (Hellison, 2003) to good effect, in so far as the “curricular goals that addressed the attitudes and behaviours related to a positive social experience included the teaching of good sportsmanship, cooperation and teamwork” (Suomi et al., 2003, p. 125). The teachers participating in this study were
considered to be caring; they generally created a positive vibe “and their friendly and caring personalities, along with their curriculum, created a positive physical and social learning environment” (Suomi et al., 2003, p. 128). The study described the social experiences reported by the students—as these experiences related in some way to the PE teacher—as positive.

The most significant factor affecting the social experiences of the students was the social content of the activities. The study identified two sub-themes: (a) obvious positive social situations, and (b) negative “hidden” social situations. In the course of the unit, both teachers overtly taught social skills and gave positive feedback to the groups. Students reported this as a positive experience, saying that they liked it when their classmates were getting along. However, at times teachers were unaware that students were being left out, a factor identified by the study as a “hidden” negative situation. These negative experiences may well have been missed due to the large number of students, all with varying abilities and all being educated in a large space. As a teacher, I find that one of my biggest challenges is to be aware of all the “hidden” negative interactions that occur in my PE classes. This particular study, especially with its emphasis on empowering students to share their experiences, has given me a better understanding of when and why these hidden negative experiences occur.

Another factor that contributed to negative social experiences was the formation of cultures within the class when teachers allowed students to pick their own teams. Suomi et al. (2003) identified three cultures: popular, comfort zone, and leftovers. The “popular” culture formed around students who were highly sought after by all the students in the class and who were generally chosen. The culture that formed around the “comfort zone” consisted of students of mixed abilities and cultural backgrounds who generally associated with students with similar characteristics; and, the culture that formed around the “leftovers,” so named because students in this group were not voluntarily selected, or were selected last. These students shared experiences of exclusion, and often had low skill levels or were disabled in some way. The study found that “popular culture” students tended not to pay attention to the feelings of
the “leftovers,” which contributed to the negative social experience (of feeling left out) of students who lacked desirable social or physical skills.

I found much the same pattern in my study. Students, in the process of designing their game, had to pick teams within their groups to “try out” their game. The more experienced students within the group generally wanted to be on the same team which meant that they tended not to include the less experienced students, which in turn caused the latter to feel excluded. The valuable insights gained from my study have prompted me to consider different strategies for selecting teams within my PE classes in order to avoid just such “hidden” negative experiences.

Suomi et al. (2003) also identified social skills as a factor that contributed to the social experiences of students in elementary physical educations classes. The researchers found that students who lacked appropriate social skills had difficulty building positive social relationships with classmates. They concluded that “developing social skills can increase the positive experiences of students in PE—a claim that is also supported by Goudas and Magotsiou (2009) who found that students who participated in cooperative group work in PE displayed enhanced social skills. The study undertaken by Suomi et al., (2003) is directly relevant to my study for the following reasons: (a) The study foregrounds the importance of giving students a voice in the research process; (b) it looks specifically at the social experiences of the students, and their interactions with each other; and, (c) it uses a models-based approach in order to explicitly addresses the social aspect of physical education.

There are a number of studies that use the Sport Education model to explore the social experiences of students in physical education. SE is a curricular model used in PE to try and replicate a typical sports season. The model features students in small heterogeneous groups working together in a team situation to compete with other teams within the class. Each students on the team is given a non-sports roles such as a coach, statistician or referee to allow students to learn about these important roles. Particularly foregrounded within the SE model are the concepts of fair play and good sportsmanship.
Kinchin and O’Sullivan (2003) use Sport Education as a way to examine social experiences within the context of PE. Students reported that they benefited from helping other classmates, and they spoke positively about decision-making and problem-solving. Significantly, marginalized students in this setting were motivated to participate through team cohesion, working together, and positive encouragement. All three of these factors allowed students to feel that the team environment was emotionally safe so they could contribute their ideas.

MacPhail, Kirk and Kinchin (2004), using Sport Education, interviewed students to see if being on a team for a long period of time affected their experience of physical education. They found that students enjoyed being on a team for a longer period of time, and they felt that they benefitted from increased interaction. The students indicated that, overall, they liked not having to keep swapping teams every day. In a study of students’ social system in a Sport Education unit, Carlson and Hastie (1997) found that socialization in PE classes emerged as an important response, along with teamwork, cooperation, and leadership. Students enjoyed being in leadership roles, and they enjoyed being coached by their peers instead of by the teacher. Similarly, Hastie (2000) examined the ecology of Sport Education, finding that students had “fun,” learned to get along, and developed teamwork skills.

The Sport Education model was used in these studies to explore the extent to which it promotes important social skills such as cooperation, teamwork, and leadership. My study showed similar findings: Once the IG focus group came to understand how social skills such as active listening and cooperation could help the game-design process, the social experiences of all the students improved. In addition, when the less experienced students started to feel that their ideas and input were being valued, their social experience was much more positive. The common thread between the studies that examined the Sport Education model, and my study which used IG, is the emphasis placed on structuring the education units in such a way that the social interactions of the students will lead to more positive experiences of PE.
Chapter 3: Research Design and Methods

This chapter will detail the methods used in the research for this study as they relate to the participants, the IG unit, and the research design. The research for this study was grounded in the qualitative methodology of phenomenology. The perspective offered by phenomenology allowed me, as a teacher-researcher, to consider the individual subjective experiences of the students in my study as they participated in small groups to invent a game in the course of a physical education unit. I also used the method of autobiography as a way to relate my childhood experiences of playing games to the social experiences of students as they participated in this IG study.

This chapter will provide an overview of qualitative research as a method of inquiry, and follow with a description of interpretative research design, and an overview of phenomenology, highlighting the main components of a phenomenological study.

3.1 Qualitative research

Qualitative research, as defined by Denzin and Lincoln (1994), in their first *Handbook of Qualitative Research* is:

multi-method in focus, involving an interpretive naturalistic approach to its subject matter…qualitative researchers study things in their natural settings attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use of and collection of a variety of empirical materials…that describe routine and problematic moments and meaning in individuals’ lives. (p. 2)

This definition highlights the major aspects of qualitative research design and illustrates why I chose this line of inquiry for my research. That is, it is my intention to gain a richer understanding of the social experiences from the students’ perspective as “qualitative research in essence seeks to find meaning in human interpretation and action” (Pinnegar & Daynes, 2006, p. 4).
3.1.1 Interpretivist research paradigm

A paradigm is essentially a theoretical framework that influences the way knowledge is studied and interpreted. Paradigms establish the intent, motivation, and expectations for research. The intent and motivation for this study was to empower students to share their experiences as they engaged in an IG unit. My purpose was to adopt an interpretivist paradigm in “trying to understand the human experience through the participants’ point of view of the situation being studied” (Creswell, 2003, p. 35). Reality, in the interpretivist paradigm, is seen as socially constructed (Mertens, 2005). As students engaged in the IG unit, they experienced individual “meanings that were socially constructed and created through the interaction and participation among members of the [focus group]” (Adams, 2010, p. 3).

3.2 Phenomenological approach

I have chosen to use the interpretative research methodology of phenomenology to examine the way in which students in the study came to understand their social experiences while creating a game in their small groups.

Lester (1999) notes that the purpose of the phenomenological approach is to illuminate the specific in order to identify phenomena according to the terms in which they are perceived by the actors in a particular situation. This will, ideally, provide a way to understand certain human experiences in more general terms or, as Creswell (2007) notes, the phenomenological method allows us to “reduce individual experiences with a phenomenon to a description of the universal essence” (p. 58). Van Manen (1990) points out that this allows us to “grasp of the very nature of the thing” (p. 177); that, by undertaking this kind of investigation, we “bring the world as world into being for us and in us” (p. 6).

Phenomenology began to take shape after World War I, through the writings of Edmund Husserl, a German philosopher whose criticism of the empiricism evolved into a new school of thought. He formulated a method (phenomenological reduction) as an attempt to
understand a society that had experienced recent conflict on a massive scale. He believed that individual experiences had the potential, if captured in a useful way, to provide researchers with valuable information. Husserl said: “we can only know what we experience” (1962). He proposed that any inquiry into human experience cannot engage in “sciences of facts” because there are no absolute facts in human experience. It remains, then, he proposed, to establish a “knowledge of essences.” Patton (1990) explains that

a phenomenological study…is one that focused on descriptions of what people experience and how it is that they experience what they experience. One can employ a general phenomenological perspective to elucidate the importance of using methods that capture people's experience of the world without conducting a phenomenological study that focuses on the essence of shared experience. (p.71)

Patton (2002) notes that phenomenological research focuses on the question, “What is the meaning, structure, and essence of the lived experience of this phenomenon for this person or group of people?” (p.32). Phenomenologists are particularly interested in how we come to understand the phenomena we experience to make sense of the world in which we live, and how this influences our perspective. With the meaning we have created from our experiences, we then have a perspective on our world.

Phenomenology, as with other methodologies in the social sciences, has characteristics that make it distinct from other qualitative forms of inquiry. It requires that two perspectives come into play in order to analyze the perception of a lived experience: that of the individual(s) who are living (or have lived) through a particular phenomenon, and that of the researcher, whose has identified an interest in the phenomenon. Van Manen (1990) explains that researchers are first attuned to a phenomenon as an “abiding concern” which has captivated them for one reason or another (p. 31). For this study, my “abiding concern” was not so much the general phenomenon of the invented game, but the experience of the individual students as they participated in the process, or phenomenon, of inventing a game in a small group. It was by way of initiating this process, that I was able to reflect on the
essential themes underlying their experiences, and thereby come to understand the nature, or constitution, of this lived experience. (Adams, 2010)

Although phenomenology may appear to be limited to the descriptive, it is also very much an interpretive process whereby the researcher “mediates” between the various meanings of the lived experiences (van Manen, 1990). As the researcher for this particular study, my strategy, once I had collected the data, was to “mediate” between the different meanings of the students lived social experiences as I came to identify and interpret these experiences. In this way I expected to form “a deeper understanding of the phenomenon through examination of those experiences” (Bound, 2011, p. 3). By focusing my research on the experiences of individuals within the focus group, I was able to obtain an “understanding from the perspective of the person or persons being studied” (Willis, 2007, p. 107).

The validity of research is established on the basis of its methods. The method of phenomenology is to generate data by eliciting in-depth individual storytelling in the hope of garnering a cumulative essence of the experience (Bound, 2011).

3.2.1 Identifying the phenomenon to be studied: The social process of inventing a game in small groups

Creswell (1998) points out that the first step in the phenomenological method is to identify the phenomenon that will define the shared experience. The phenomenon of interest for the purposes of this study is the social process of inventing a game in a small group—a phenomenon which can be divided into a number of specific experiences (Bound, 2011) coming out of the variety of social interactions experienced by the students during the game design process. Following from Bound (2011), I identified the specific experience as a “focal point that [was] shared and thereby bound the relevance of the experience to the participants” (p. 4).
3.2.2 Researcher bias

Creswell (1998) identifies the second step in the methodology of phenomenological research as identifying potential bias, instructing the researchers to “bracket and interpret researcher bias and expectations.” Creswell (2007) emphasizes that, as difficult as it may be, researchers must attempt to limit their personal bias and approach the identified phenomenon with an open mind. The bias of the researcher can taint the research results, and sound practice dictates that researchers identify areas that might create bias and potentially compromise the research conclusions (Creswell, 2008). Moustakas (1994) identifies this as “epoche” or “bracketing,” after Husserl (1962). Bracketing requires that researchers set aside or suspend their experiences, as much as possible, to allow a fresh perspective to develop with respect to the phenomenon under examination. Moustakas acknowledges that this state is seldom completely achieved, and van Manen (1990) emphasizes that it is impossible for the researcher to be separate from the text. Creswell (2007) proposes that we could use a new definition of epoche or bracketing (following from LeVasseur, 2003) “such as suspending our understandings in a reflective move that cultivates curiosity” noting that “the researcher needs to decide how and in what way his or her personal understandings will be introduced into the study” (Creswell, 2007, p. 83).

As I conducted this study, it was important to address the extent to which my personal understandings would inform my interpretation. It was clearly necessary to describe my own experiences within the phenomenon I was attempting to understand, and to bracket my views before proceeding to describe the experiences of others. I knew this was essential in order to identify my potential biases, and allow me to approach the data with an open mind. Therefore, as I considered the methods required for this study, I have included a brief account of my own personal experiences with physical education, and how these experiences shaped me as a PE teacher. In so doing, I clarified for myself, and for the purposes of this research, that my experiences with PE were mostly positive, which meant that I had to stretch myself to understand students who had negative views of the experience. By “bracketing” my biases and expectations, I was better equipped to approach the data with an open mind and, in
this way, gained valuable insights into some of the reasons why students in the focus group did not have positive experiences in the course of the IG process, or with PE in general. In addition, I used the technique of autobiography to describe my personal experiences creating games as a way of highlighting the differences between my students’ experiences and my own remembered experiences.

Additional components of the research process will be described below.

### 3.3 Autobiography

For this study I used an autobiography as a method within the framework of phenomenology as a way linking the students’ experiences of inventing games during PE to my own childhood memories of playing games with my brother and friends. Ellis et al. (2011) note that, “when writing an autobiography, an author retroactively and selectively writes about past experiences.” They emphasize that authors do not anticipate the publication of their experience as they live through them; rather, they assemble their experiences using hindsight. In writing, the author also may interview others as well as consult with texts like photographs, journals, and recordings to help with recall (Denzin, 1989). For the purposes of this study, I brainstormed my childhood memories of playing games in the backyard with my brother and friends, and then systematically related them to the IG study described in this thesis. Once I created a list of my memories, I undertook a number of informal conversations with my brother and mother—who both figure prominently in my narratives—in order to get their perspective on my recollections. This was a valuable experience for me, allowing me to understand how these experiences helped shape me as a person and, in turn, as a teacher.

In addition, autobiographers identify “epiphanies”—remembered moments perceived to have had a significant impact on the trajectory of a person’s life (Bochner, 1994). The moments where I recalled my childhood experiences with games were epiphanies for me. Had I not gone through the process of recalling my memories, and talking them over with my brother and mother, I would not have realized the extent to which these after-school games shaped me. My mother instilled in me the values of inclusion, fairness, and cooperation—many of
these in the context of the games we played—and these values inform the principles that I convey to my students. As well, growing up with a younger brother taught me to work out how to modify games and change the rules to make the games more inclusive, challenging, and enjoyable for both my brother and myself.

By exploring my childhood experiences using autobiography, and exploring the students’ experiences using the methods of phenomenology, this study will look at the ways in which my teaching practice has been shaped by my own experiences, and how my new understandings are likely to shape my teaching practice in the future. Exploring the lived experiences of students as they worked through the IG unit has provided me with invaluable insights as I work to provide an inclusive environment, which can embrace diverse individuals and differing opinions within my classroom. In addition, coming to understand the way individual students experience PE, by using a phenomenological approach to parse these experiences, gives me a better understanding of why students do not enjoy PE or sport as much as I did as a young person.

3.4 Methods

In this next section, I will describe the methods that were used for this study, beginning with my personal biography, from my perspective as teacher-researcher. I will also outline the grouping strategies I used to group students for the purposes of this study, along with a brief description of each student in the focus group. In addition, I will highlight the research design and the data analysis used for this study.

3.4.1 Teacher-Researcher

Creswell (2008) emphasizes that, before proceeding with phenomenological research, it is important that the researcher begin by describing their own experiences and “bracketing out” their biases before attempting to interpret the experience of others. In the following section, I will describe my trajectory as a PE teacher, and reflect on how my experiences as student have helped shape this trajectory.
Prior to entering the graduate program in the TGfU cohort I completed my Bachelor of Human Kinetics (Physical Education) at UBC, followed by my Bachelor of Education. My experiences of physical education as a child were largely positive, in part because I have always been interested in sports. My high school PE teachers used a “command” teaching style, and the classes focused primarily on learning isolated and individual skills in the context of playing the complete (adult) versions of their selection of games.

It was not until I entered the undergraduate program at UBC that I realized there were other ways to teach PE. It was here that I learned about Teaching Games for Understanding (TGfU), a curriculum model that focuses on the psycho-motor, cognitive, and affective learning domains using small-sided games. This approach interested me immediately because I could see that TGfU employs games to teach tactics and concepts, rather than developing isolated skills which do not transfer well to the actual playing of games. As a teacher candidate I employed the TGfU approach with mixed results because I found it difficult to “parachute” into a class, and to change the expectations of students who were accustomed to the command style of teaching.

When I moved on to having my own PE class in my second year as a teacher, I was more successful in implementing the TGfU approach. However, as I began my career, I noticed that some students were still not enjoying PE in the way I did as a young person. With this preoccupation in the back of my mind, I was aware that I would need to consider different methods for creating an environment that would allow all students to enjoy PE and sports to a greater extent.

In the fall of 2009 I met Dr. Joy Butler when I applied for the second TGfU cohort in the graduate program and, in the process, I joined the Inventing Games (IG) research group. See Appendix A for the wider study consent form. This group consisted of six teacher-researchers from around the province who met throughout the three year study in an effort to learn about IG, and who would be undertaking the IG research in the setting of their own PE classes.
Inventing Games, as a process and as a pedagogical tool, has allowed me to provide students with the opportunity to take some control over their own learning in a creative way during PE. In addition, my concern with creating an environment where students can practice life skills as they develop their physical skills prompted my involvement this study presented here—with its focus on the social experiences of individual students as they engage in the process of inventing a game in the setting of PE. The study has given me an invaluable perspective on the way in which students respond to IG, and to PE in general.

Prior to reading through the data (journals and interviews), it was important for research purposes that I identify my personal biases and expectations—by way of a process known as “epoche” or bracketing (Creswell, 2008). It was critical to the study that I approach the data with an open mind so as to not let my personal biases conflict with my reading of the experiences recorded by the students. For example, it is a challenge for me to relate to students who do not enjoy PE, and in order to analyze the data from this study I had to open myself to different opinions and ideas about the subject that I teach.

3.4.2 Participants and grouping

I undertook my research—which focused on students inventing their own games—with a grade eight physical education class of 26 boys in Vancouver, British Columbia. The study was initiated by grouping this class of students (who had permission to participate) into four small groups consisting of six or seven members, with each group including a range of students with diverse abilities and experiences. See Appendix B and C for the letters of consent and assent that the students had to sign for permission to participate in this study. I involved the students in selecting the groups: The students were first asked to select a partner, and I then placed each set of partners with a group of four or five, so that two groups included six students, and two groups included seven students (because two students had been absent on the first day).

As the teacher-researcher I placed the self-selected pairs into groups of my choosing to ensure that the skill and experience levels of all the groups were more or less evenly
distributed. I attempted to ensure that each group represented the heterogeneous nature of this class (and most other PE classes I have taught). My selection strategy took into consideration Polvi and Telama’s (2000) findings that students who interacted in small groups (4-8 students) reported increased positive social experiences compared to those students who worked in larger groups (more than 8), or groups who worked in pairs.

3.4.2.1 Focus group

Once the groups had been formed, I selected the focus group “out of a hat.” Only one group was selected as the focus group due to the logistical and budget constraints of the larger study (conducted by Dr. Joy Butler and Dr. Tim Hopper)—although all groups in the class completed the same IG unit. The benefit to this was that, by studying only one group, I was able to get a richer and more precise understanding of the experiences of the students as they engaged in the IG unit. The focus group included seven students, a number which allowed me to usefully compare and contrast the lived experiences of all the students within the group. I kept in mind Lester’s (1999) observation that “in multiple participant phenomenology research, the strength of inference which can be made increases rapidly once factors start to recur with more than one participant” (p. 3).

3.4.2.2 Group composition

I characterized each student within the IG focus group on the basis of my perception of their experience level: either as having more experience (ME) or as having less experience (LE) playing games. (A more detailed description of how I characterized each student can be found in the participants section). I am fully aware that there is a range of experience within both the ME and LE categories, but for the purposes of this study I chose to limit my grouping to these two categories.

The rationale for categorizing each of the students as ME or LE was (a) to compare the findings from my study to a study by Butler (2007), and (b) to explore whether experience level would affect the social experiences of the students in the process of designing a game.
As noted previously, Butler (2007) grouped students according to their experience with playing games; she also created two groups within her focus group, to distinguish those with experienced playing games from those with less experience. Butler’s study showed that the experienced games players had more difficult time making decisions, and this resulted in conflict situations as the game-design proceeded, whereas the less experienced group worked cooperatively to share ideas, and were able to listen to each other without much interruption. For my study, I wanted to create groups with a mixture of ME and LE students in order to usefully compare my findings to those of Butler’s (2007) study. More specifically, I was interested to see how the grouping strategy would affect the social experiences of the students in a group that contained both ME and LE students.

3.4.2.3 Participants

As noted above, I characterized the students on the basis of their experience, particularly with respect to playing territorial games, at school and outside school. I made this judgment based on: (a) my experiences with the students in the first four months of the school year as their PE teacher, (b) my informal conversations with them, and (c) my analysis of their personal biographies where they had been asked to describe their experience with territorial games, both in the past and at present. While this brief biography did provide a snapshot of each student’s experience with territorial games, it did not reveal contextual information such as family, cultural, or ethnic background, all of which might affect the student’s decision to play or not to play sports.

Following is a brief description of each student (with pseudonym) in the focus group, with a description of his experience with territorial games.

Mark, 13 years old (more experienced games player):

Mark was born in Canada and is Caucasian. He plays a high level of hockey and rugby in the community and on school teams. He has played both sports since he was five years old. He enjoys playing these sports recreationally and competitively with his friend’s afterschool.
Ben, 13 years old (more experienced games player):

Ben was born in Canada and is of Asian descent. He plays basketball for the school and plays organized soccer outside of school. Ben is consistently at the top of the class for fitness testing, and he enjoys playing sports after school with his friends. He has played basketball since he was 9 years old.

Billy, 13 years old (less experienced games player):

Billy was born in China and moved to Canada 4 years ago. He has little experience with territorial games but plays badminton recreationally. He enjoys playing in the school band after school, and plays competitive computer games with his friends.

Nick, 13 years old (less experienced games player):

Nick was born in China and moved to Canada 4 years ago. He does not play sports outside of PE but enjoys baseball. After school he attends a learning academy, and otherwise likes to draw and play computer games.

Troy, 13 years old (less experienced games player):

Troy was born in Canada and is of Asian descent. He does not have much experience with territorial games outside of PE class. He enjoys outdoor activities such as hiking, and he likes to play video games and read novels outside of school.

John, 13 years old (less experienced games player):

John was born in Canada and is Caucasian. He has very little experience with territorial games and does not really enjoy physical activity. He enjoys reading, playing video games, and watching movies.

Todd, 13 years old (games player):
Todd was born in China and moved to Canada a year ago. He does not enjoy physical activity but likes to read comic books and play computer games. He has very little experience with territorial games and explained that in China most of his PE classes consisted of running and swimming.

3.4.3 School setting

The research setting for this study is a secondary school in a wealthy west-side neighbourhood in Vancouver, Canada. About 80% of the students who attend this school are of Asian descent. The school enrolls about 1,200 students and includes grades 8-12. It has one gymnasium, which is divided into two sections for most PE classes (placing spatial and logistical constraints on organizing a PE class). Students take part in PE between 2 to 3 times a week for 80 minutes, and PE is compulsory until Grade 10. The class chosen for this study consisted of 28 male students, of whom 20 were of Asian descent and 8 were of Caucasian descent.

3.4.4 Research design

The unit used for this research was based on prior curriculum development, and it was used by all the teachers included in the larger study. I had already field-tested the unit with some other classes two years earlier, in 2011. See Appendix D: Unit Plan.

For the IG unit developed for the purpose of this research, I chose to have the students create a game within the territorial games category. This is the most complex of the four game categories and, while this might seem counter intuitive, my rationale was based on (a) PE department scheduling, and (b) the continuity of the transfer of skills and concepts with which I was already working to develop in my students.

Part of the reason that I chose to focus and have the students construct a territorial game for the Inventing Games unit had to do with scheduling constraints. The PE department at my school worked together to schedule what units or sports would be undertaken and when they would occur in the course of the school year. In September, my class was scheduled to
complete a rugby unit, followed by a basketball unit and, in late October, I was scheduled for
the main gym where I was then able to conduct the IG unit. With these scheduling
constraints, and because my class had just finished two units already within the territorial
games category (rugby and basketball), it would be beneficial to them, in terms of my
curriculum goals (i.e., the transfer of skills and concepts), to require students to create a game
within the territorial games category.

The IG unit for this study consisted of eight 80-minute sessions, and classes were held two to
three times per week. The first session in the unit, identified as Class “0,” required all the
students to pick a partner and, together, brainstorm to come up with the ideas to be included
in their inclusive decision-making policy. Keeping these pairs together, I then formed several
groups, within which the group members combined all their ideas about an inclusive
decision-making policy and came up with a final version. This process was followed by a
class discussion about how to make decisions that would include all members of the group,
after which some groups made changes to their policy. The groups were then instructed to
type out their policy and place it at the front of their IG planning folder (see Appendix E for
student handout).

For first three sessions, the students were required to create a territorial game within their
groups applying their decision-making policy. During these first sessions, the groups also
made decisions about the game itself, including the name, the boundaries, the scoring system,
and the basic rules. In the fourth session, the groups showcased their games to the other
groups (see Appendix F: Showcase Structure). As part of the showcase session, one group
would teach their game to another group. For example, Group 1 taught their game to Group
2, while Group 3 and Group 4 observed from the sidelines and provided feedback to the
presenting group. The groups rotated so that all groups would have a chance to present their
game. In the fifth and sixth sessions, each group had to look at all the feedback and revise
their game in order to make the game more enjoyable, inclusive, and safe. In the seventh
session, the groups demonstrated their game at a second showcase after discussing their game
design process between themselves, identifying what worked well and what did not work as well, and assessing how well they adhered to the decision-making policy.

Table 1: Timeline for data collection

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<th>SESSION</th>
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3.4.5 Data generation

The primary source for the data collected for this study came from the interviews and the student journals. Patton (1990) emphasizes that the purpose of interviewing and journaling is specifically to "find out what is in and on someone else's mind," which perfectly summarizes the focus of this phenomenological study. He notes that researchers, by using a variety of data sources, can build on the strengths of each type of data collected, and minimize the weaknesses of any single data collection approach (Patton, 2002).

3.4.5.1 Journals

The students were asked to write about their social experiences after each session during the 20-minute “silent reading” break,. Creswell (2007) identifies two focal points for informing the selection of relevant data necessary for a sound analysis: “What have you experienced in terms of the Phenomenon? And “what contexts or situations have typically influenced or
affected your experience?” (p. 61). For the purposes of this study I asked the students to focus on the game design process, and to write about their lived social experiences of creating the game in the group setting. I assured the students that I would not look at their journals until their marks had been finalized for the first term. See Appendix G for the student handout regarding the journals.

3.4.5.2 Interviews

The students were also interviewed for the purposes of the larger study after Session 3, and at the end of the unit (Session 8). These questions were open-ended and concentrated on the game design process, focusing specifically on how decisions were being made during this process. I did not see these transcripts until marks were completed, but they were examined by Joy Butler, the principal investigator of the larger study, prior to this time.

After Session 5, Butler held a focus group meeting. This meeting was not part of the original research design but, after her reading of the first set of interview transcripts, she decided that this was an appropriate ethical decision. The questions at this meeting addressed some of the issues encountered by the focus groups with respect to equal participation in the game design process. We also addressed the issue of active listening, and the ways in which the group might be encouraged to create a more inclusive environment that would take into consideration the diverse opinions of the group. All of the students in each group had an opportunity to express their experiences up to this point, and everyone else had to listen. This process enabled all the group members to have some insight about how each group member was feeling. This turned out to be a valuable tool which allowed the group to create a more inclusive game, and which allowed the members to work together in a more cohesive fashion. See Appendix H for the interview questions.

3.4.6 Data analysis

Lewins, Taylor and Gibbs (2005) note that data analysis involves methods and procedures where the data shifts from the qualitative data that have been collected into some form of
description, explanation, understanding, or interpretation of the people and situations being investigated. As I examined the lived experiences of the students, as they described these during interviews and in their journals, I followed Creswell’s (2007) technique of highlighting “significant statements, sentences, or quotes that provided an understanding of how the [individual students] experienced the phenomenon” (p. 61). Creswell (1998) notes that the data analysis process for a phenomenological study includes data reduction, analysis of specific statements and themes, and a search for all possible meanings. These components will be discussed below.

### 3.4.7 Data transcription, organization, and reduction

This study generated a significant amount of data, including seven journal entries for each of the seven students, along with two interview transcripts for each student. Each journal entry was professionally transcribed into Microsoft Word; each file was labelled with the student’s name and included all the transcripts from the journals and the interviews—48 transcripts for each student.

In order to make sense of all this data I had to develop a process to organize and reduce it. Miles and Huberman (1994) describe this process as “data reduction,” essentially a process of selecting, focusing, simplifying, abstracting, and transcribing. I began by carefully reading through each interview transcript and journal entry in order to, as Lester (1999) advised, “get a feel for what is being said, [and identify] key themes and issues in each text” (p. 2). I followed this initial reading with a second reading in order to organize and label it according to different themes that highlighted the social experiences of the students.

### 3.4.8 Coding

In the process of reading the transcripts for the second time, I used a colour-coding system and applied it to every journal entry in each student file as a way of identifying any text that referred to a social experience. Following this, I used Microsoft word “copy and paste” to
move each colour-coded passage (from both the journal and interview transcripts) into the appropriate category.

3.4.9 Themes and patterns

Once the data was coded, I organized and summarized it. I identified twelve themes that characterized the social experiences of the boys as they participated in the IG unit. Then, following from Lester (1999), I “aggregated and organized” my themes “with the aid of a mind-map” (p. 2). My mind-map allowed me to make visual connections between the twelve themes, and led to re-grouping these themes into four larger themes which I have identified as headings in the results section below (see Appendix I: Mind Map of Themes). Within each of these four themes, I set out a number of sub-themes on the basis of the mind-map, with reference to the original research question. This process allowed me to identify the patterns and themes that best characterized the social experiences acknowledged by the students as they participated in the IG.

3.5 Conclusion

The purpose of this study was to look at the way in which grade eight boys engaged in an IG unit, particularly with respect to their understanding of their social experience as they worked together to create a game in a small group setting. I chose to do this using a phenomenological approach to the data, which allowed me to usefully identify the distinct and unique features of each student’s social experiences, as well those features common to the experience of the group, i.e., to the students who have experienced the same circumstances together. I related my childhood experiences of playing games to the student’s experiences by way of generating an autobiography.

The data generated by this study included transcripts from daily journals and interviews conducted by research assistants from the wider study. I colour-coded the transcript texts (in Microsoft Word), which allowed me to identify “clusters of meaning” and use these, following from Creswell (2008), to develop “descriptions of what the participant experienced, or
textural descriptions, and descriptions describing the context or settings that influenced the experience, or structural descriptions” (p. 61). Once I identified the twelve themes that emerged from the data, I used the technique of forming a mind-map to combine similar themes which led me to identify the four major themes which characterize my results (discussed below). The data and insight gained from a phenomenology study can be invaluable as “knowing about common experience amongst participants can be valuable to groups such as therapists, teachers, health personnel, and policy makers” (Creswell, 2007, p. 62). This statement holds true for my study: exploring each individual student’s social experience has enabled me, as a PE teacher, to gain insight into the way in which students interpret IG and PE in general.
Chapter 4: Results

Four themes were identified from the data—journals and interview transcripts—when it was analyzed in the terms set out by the research question: What are the lived social experiences of grade eight boys engaged in physical education, particularly in the process of engaging in an Inventing Games unit over the course of 8 weeks. A phenomenological approach was used to frame the research question and to code the data according to its emergent themes. Within these four themes, sub-themes were also identified to add detail to the characterizations of the lived experiences of students (see Table 2: Summary of Themes).

In this chapter I will include the results of my autobiography narrative, where I capture and reflect upon my childhood memories of playing games with my younger brother and friends. In this way, I will attempt to link the students’ experiences of inventing games during PE to my own childhood memories of playing games. I have identified my narrative in italics below. By comparing my experiences as a child to those of the students during the IG unit, I aim to offer personalized insights based on my experience of playing sports and inventing territorial games as a child. But, by framing my account as Hopper et al. (2008) encourage, that is, in such a way that readers feels invited bring their own meaning to my story, to put something of themselves into the text, my hope is that readers will be able to identify with my account and relate it to their own experiences.

When I analyzed the data I was looking for patterns and themes. The four themes that I was able to identify best characterized the students lived social experiences as they participated in the study. These are: (a) inclusion and the decision-making policy, (b) acknowledging ideas, (c) the student-selected team-selection process, and (d) relating the IG process to “real life” situations.
Table 2: Summary of Themes

<table>
<thead>
<tr>
<th>THEME</th>
<th>DESCRIPTION</th>
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| **1: Inclusion and The Decision-Making Policy** | • Students within the focus group found it difficult to adhere to their inclusive decision-making policy.  
• A divide between the group members caused conflict  
• Three critical incidents allowed for a more inclusive game |

**Sub-Themes**

(a) **The Divide Between the More Experienced (ME) Student’s vs Less Experienced (LE) Students** | • A divide between students who were more-experienced (ME) and less-experienced (LE) developed over the first few classes  
• Divide caused conflict and lead to three main issues:  
  o some the group members felt like their rule proposals were “not being heard”  
  o the ME students wanted to invent a traditional territorial game  
  o the athletes in the group thought that they should have more influence over the game-design process  
• The focus group was at an impasse and something needed to happen to allow for an inclusive environment to develop |

(b) **The Critical Incidents** | • Three major critical incidents occurred that resulted in the group being able to create an environment that was inclusive to all group members ideas  
  o Critical Incident 1: No Dribble Rule - LE student within the group proposed a rule that disallowed dribbling which made the actual game more inclusive  
  o Critical Incident 2: Focus Group Meeting – Halfway during the unit, as the PI of the larger study and myself saw the group experiencing conflict, a focus group meeting was called to allow for all students to share their experiences  
  o Critical Incident 3: Ideas Box – After the focus group meeting students created an ideas box where all students in the group would put ideas for their game into a box and try them out in their game. |

**2: Acknowledging Ideas** | • Students within the focus group expressed that they felt a greater sense of belonging to the group when their ideas were acknowledged by the group  
• When the idea box was introduced the group members felt that this allowed all ideas to be acknowledged and created an inclusive game-design process  
• This theme had a significant positive impact on the social
experiences of the students

<table>
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<th>THEME</th>
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| 3: The Student Selected Team-Selection Process   | • While the focus group was designing their game they were required to practice their game  
|                                                 | • Students were left to their own devices to organize teams, and this caused a lot of negative social experiences within the focus group  
|                                                 | • The ME students put themselves on one team which made the game one-sided and boring  
|                                                 | • The LE students felt humiliated and angry that the ME students organized the teams in this manner  
|                                                 | • This theme had significant negative impacts on the social experiences of the students                                                                                                                                 |
| 4: Relating the IG experience to “Real Life”     | • Students within the focus group shared that they found the skills they had practiced during the game-design process were relevant to “real life” and could be useful for the future |

Sub-Themes

(c) Cooperation as Helping for the Future

• Students expressed that cooperation is an essential social skill that is needed in school and in their future endeavours  
• Once the group was able to cooperate (and they defined this as giving everyone an opportunity to express themselves within the game-design process) they enjoyed creating their game

(d) The Difficulty With Making Decisions

• The group felt that it was difficult to make decisions that everyone agreed to, however, they acknowledged that making these “tough” decisions would help them for future group-work situations

(e) Listening as the Key to Game Development

• Once the group started to “actively” listen to one another the game-design process became more inclusive and had a positive impact on the social experiences of the group members

4.1 Theme 1: Inclusion and the decision-making policy

The first theme that emerged from the data was that of inclusion within the game design process, and how this had an impact on the decision-making policy. One of the important conditions set out by the IG unit was that students were required to include all the group members in the construction of the game, and they had to find meaningful roles for each
member of the group as an active player in the game they created. Each group used the decision-making policy they created (described below) to help make decisions in a fair and equitable way. However, as this section will illustrate, the focus group members found it difficult to agree on a number of different decisions as they constructed their game. This caused conflict within the group and issues, particularly that of exclusion, soon became apparent.

The two sub-themes that emerged have been identified below to elaborate the issue of inclusion: (a) the divide between the more experienced (ME) students and the less experienced (LE) students, and (b) “the critical incidents.” These will be addressed following the description of the process involved in creating a decision-making policy, and an explanation of the rationale for including it in the IG process.

4.1.1 The decision-making policy

The process of creating the decision-making policy was central to the social experiences of the students in the course of this IG unit. The students were required to create this policy at the outset. It was designed to help ensure that all group members would have an equal opportunity to contribute to the game design. I provided the students with an outline of Butler’s (in press) decision-making policy as a starting point for their creating their own policy. As the unit continued they were able to add components to the policy. Following are the specific points set out by the decision-making policy developed by the focus group (with points that were added in later sessions are highlight in bold):

1) They could not decide upon rules without establishing a group protocol for making group decisions—one that is fair, equitable, and speedy.

2) No one could be excluded from the discussion, although individuals were not required to contribute.

3) Rules could not be imposed by just one member of the group. The technique of a talking stick was introduced after the fourth session.
4) The group would use a decision box to get ideas from all members. Group members would write down rule proposals and put them into box, and the group would try them out during the game (added in the fourth session).

This decision-making policy, once finalized, was placed at the front of the IG planning folder for each group so they could refer to it when group members felt that they were not being included in the game construction.

4.1.2 The division between the more-experienced and less-experienced players

It became evident, when analyzing the data from the first and second sessions that a clear division had developed between the students who had more experience playing territorial games, and those who had less experience (see Chapter 3 for the short profile of each group member). I identified Mark and Ben as having more experience (ME), and the others (five members) as having less experience (LE). I made this determination on the basis of information I had gathered through conversations with the students about their experiences with sports, the personal biographies they had submitted to me, as well as on the basis of my own observations made over the course of their participation in my PE classes.

Once the groups had formed and the decision-making policy was agreed upon, the group had to make decisions about the basic rules and regulations of the game (in the first two sessions). They had to address questions such as the following: What will be your playing area? What will be the purpose of each line? What type of ball or other equipment will you use? What will your goal look like? How will you move the ball? What are five basic rules (including one safety rule) that you need for your game?

In order to address these questions, the group had to collect ideas from the group members, and they had to use the group decision-making policy to organize their ideas. As the students began to propose ideas for the game, the group experienced its first conflict—a conflict that originated in the division that was forming between the LE and ME students and had to do primarily with the following factors: (a) some of the group members felt that their rule
proposals were “not being heard,” (b) the ME students wanted to invent a traditional territorial game, and (c) the athletes in the group thought that they should have more influence over the game design process on the basis of their abilities and their accomplishments as athletes.

4.1.2.1 “…Not being heard”

The first two sessions in this study were particularly important to the game design process because it was at this stage that the students were to set about creating the basic elements of their game and begin to propose ideas using the decision making policy. These proposals were to take into consideration the basic premise of the game, the rules, the equipment, and the scoring system.

Instead, what started to develop, according to one student, was “…an overload of ideas. I mean everyone kept giving their ideas, and we were trying to write them down, but there was too many…” (Ben, journal entry, October 11, 2013). As this “overload of ideas” developed, it also became apparent that the LE students (all five) were reacting to the sense that their ideas were not being heard. During the game design process, one of the important constraints placed on the students was that all students had to be included in the game design process. When I (and the principal investigator of the wider study) saw things breaking down in the focus group during the game design process, I intervened to ensure that all students were being included during the construction of the game. For example, I asked students in the focus group whether the group was actually using the decision-making policy. This prompted the group to focus their attention back onto the decision-making policy and have a conversation about the importance of inclusion within the game design process.

Even though students were given the opportunity to present their ideas, it was evident that not all of the individuals in the group were actively or genuinely listening to each of the ideas being presented. John highlights how the ME students in the group, Ben and Mark, displayed their lack of interest when the LE students would suggest their ideas:
Ben and Mark were constantly just shooting balls at the basket or sometimes they would just laugh at our ideas when we were trying to create our game…. Even though we would listen to their ideas and write them down, they couldn’t even give us two seconds of attention when we had different ideas to theirs” (John, journal entry #2, October, 11, 2013).

John’s observation highlights a typical response by the ME students to the ideas of the LE students, with the result that the sense of not being heard negatively affected the social experiences of all of the LE students. In essence, the LE students felt that, because their ideas were not being heard, they were being shut out of the game design process. Troy, when asked what he expected from all of the group members in terms of listening to ideas, responded by saying, “yeah but we will actually well I would say we will at least listen to the idea and at least consider before you make the choice” (Troy, journal entry #3, October 16, 2013).

The division between the ME and LE students also hindered the progress of their game construction. Near the end of the second session the group realized that they would have to come to some concrete decisions about their game, knowing that they would have to showcase it in the fourth session. This “time crunch” resulted in the exclusion of the ideas put forward by three of the LE students. Mark, one of the ME students, explained that, “It is so frustrating because most of the ideas in the group are so weird, they want to play a Harry Potter game or something, they are just holding the game up, we need to get something started” (Mark journal entry #2, October 11, 2013). All of the LE students then began to “give in” to the ideas from the ME students in order to move the game along and, consequently, by the third session, the group had created a game that was beginning to look very similar to soccer and basketball. It was no coincidence that these two sports were those played by the ME students outside of school. As Troy observed, three of the LE students “came up with a four corner handball game, but Mark and Ben did not think it would work so we just played their game…I really hope that in the coming classes we get to have some input into the game” (Troy, journal entry #3, October 16, 2013).
Having their ideas shut out of the game design process resulted in a negative social experience for the LE members, and even caused John to reflect on his prior experiences in PE:

This always happens in PE, I basically just have to go with what everyone else says and then stay out of the way so I don’t screw anything up…I thought this unit might have been different because we talked about democracy and decisions, but nothing has changed. (John, journal entry #2, October 11, 2013)

At this point in the unit, it seemed as though the LE students had resigned themselves to the fact that the ME students would create the game and they would go along with it. Having their ideas excluded from the process brought back negative prior social experiences that the LE students had encountered in PE.

4.1.2.2 The default to traditional games

The proposals put forward by the ME in the group, Ben and Mark, were heavily based on traditional territorial games with which they were familiar. On the other hand, the LE members proposed rules that were more creative and not as heavily based on traditional games. Like Mark (above), Ben complained that, “the rules that they were coming up with did not make sense, they were weird, we are trying to make a real game here” (Ben, journal entry #2, October 11, 2013). Clearly, the ME students in the group felt that ideas that did not mimic traditional games were “weird” or “didn’t make sense.” All of the LE students, for their part, appreciated the opportunity to be creative and combine rules in less traditional ways. John acknowledged that the creativity allowed by IG unit appealed to him, and he was excited to integrate other interests of his (such as video games): “The IG process got my attention right away because it gave me a chance to do things as I like for the game…things like putting aspects from video games I play into a sports game really seems interesting” (John, journal entry #1, October 9, 2013).
4.1.2.3 Who gets to have the most say?

All animals are equal, but some animals are more equal than others (Orwell, 1946, p. 104).

This well-known epigraph from Orwell’s (1946) novel *Animal Farm* underscores what seemed to be happening in the IG group. The ME students in the group genuinely felt that they should have more say in the game design process because of their experience with team territorial sports. Ben explained that,

> We need to get this game done, Troy and Billy are giving ideas that don’t make sense, they won’t work. The group needs to leave the game up to Mark and me because we have played sports for so long. (Ben, journal entry #3, October 16, 2013)

Interestingly enough, the ME students’ sense that they had more of a “right” to create the game was in direct contradiction with their group decision-making policy, especially the third condition in the policy where it was clearly stated that “no member(s) can impose their ideas on the group.” In spite of this, the ME students felt entitled to impose their ideas on the group by taking over the decision-making process and shutting out other ideas; in spite of the decision-making policy the ME students felt that they were “more equal.”

The group started out with an honest attempt to use their decision-making policy, but when an “overload of ideas” started to impede the game design process, the ME students stepped in to exclude all of the LE students’ ideas because they “had played more sports outside of school” (Mark, journal entry #2, October 11, 2013).

The next section will show how three different “critical incidents” occurred in the process experienced by the focus group, and led to a more inclusive game design exercise.
4.1.3 Critical Incidents

It was clear by the first two and a half sessions that the decision-making policy which the group had agreed upon was not working and/or not being used. The game design process at this point was not inclusive of everyone’s ideas; not all the contributions were being valued, and rules were being imposed by one or two members of the group. At this point in the unit the first of three critical incidents occurred. These three incidents changed the direction of the group towards a more inclusive and enjoyable environment. This positive shift was enabled by the inclusive decision making policy, and by creating a more supportive environment (facilitated by the teacher). It was in the third session, as the group was revising the rules and the scoring system of their game, the first critical incident occurred.

4.1.3.1 Critical Incident 1: The no-dribble rule

The critical incident, prompted by one of the less experienced students, is well-expressed in the following journal entry and marks the beginning of the group’s evolution towards a more inclusive social experience:

Finally during the class as we prepared for the showcase next day, it was like so obvious that our game was not working. Ben and Mark just kept getting the ball and dribbling for a goal and the rest of us would just watch. After a while I stepped up and said we need to change something because this game is not working….So I suggested that we use a rule like ultimate, where when you get the ball you can’t dribble, hopefully this will make Mark and Ben pass to us. (Troy, journal entry #3, October 16, 2013)

The “critical incidents” sub-theme developed here is based on two different events that occurred during the unit, both of which enabled a more inclusive social environment within the group. This first critical incident came in the form of Troy’s proposal to make a rule that would not allow dribbling, essentially forcing the ball handler to pass the ball and thereby
including more students in the game. Up until this point, the game design process has been dominated by Mark and Ben who, as it turned out, were good at dribbling the ball.

At some point, the group members were beginning to see that even Mark and Ben, the more experienced athletes, were starting to notice that the game was not working, which led them to be somewhat more open to other ideas:

Even Mark and Ben are getting bored with their game as they kept scoring and stuff…. So we are getting worried because the next day is the showcase and our game is not inclusive, two people can [not] just do everything. So when Troy had the idea to stop dribbling, we tried it and it worked well. Even though Mark and Ben won’t admit it, it was a good idea. I had an idea for the game too, but they said we have no time. (Nick, journal entry #3, October 16, 2013)

This rule change was agreed upon and initiated during the third session, in time for the showcase. As Nick observed, while other LE group members had some ideas to contribute, both the lack of time and the hesitation of the ME members to allow for other ideas, the game was essentially still a game created by Mark and Ben—a combination of basketball and hockey, using a hockey net as the goal.

During the showcase, in the process of presenting their game to the rest of the class, the focus group noticed that, when another group test-played their game, the “no dribble” rule introduced by Troy actually made the game really flow as well as making it more inclusive. John commented:

I heard the other group say that they liked the ultimate rule because then I get the ball, this was good because one of the criteria for our unit was that it had to be inclusive, and I think this made our game have more flow. (John, journal entry #4, October 18, 2013)
At the end of the showcase, each group had time to meet and reflect on the state of their game. It turned out that the other group members hoped that Troy’s “no dribble rule” would be the catalyst, allowing other members of the group to have input into the game’s design. However, as Troy found, this was not to be the case:

I mean we talked about the rule and how well it worked Ben and Mark said ya it worked, but they weren’t interested in hearing other ideas for [the] next day, I mean this is frustrating because I think we all can make ideas that work well. (Troy, journal entry #4, October 18, 2013)

Even though the “no dribble rule” worked well in the game it did not seem, to all of the LE students, that this success affected the attitudes of Mark or Ben, who still seemed hesitant to listen to everyone’s ideas. As shown by Troy’s journal entry (above), this caused further frustration. But, as Ben commented, this rule change did start to change his attitude, albeit slightly, about being more open to the ideas of others, and about creating an inclusive environment:

The showcase went well, I thought our game was better than most other games and ya the rule to make no dribbling worked well and I think that the group who played our game liked this too, it made people pass and I guess this is good. (Ben, journal entry #4, October 18, 2013)

Although Ben does not give direct credit to Troy, it appeared that Ben was open to rule changes that were not necessarily created by Mark or Ben. So, although this “no dribble rule” did not make the game design process entirely inclusive, it did move the process in the right direction.

4.1.3.2 Critical Incident 2: The focus group meeting

Following the third session, Butler, the principal investigator, held interviews to track the progress of the study. It became apparent to both of us at this point that there were some major issues within the group, specifically the exclusionary dynamic which was by then well
underway. After consulting with me, we agreed that Dr. Butler would meet the students together after the fourth sessions to discuss some of our concerns about the communication process in the group.

During this meeting with the focus group, Dr. Butler asked each student to identify their issue with the group, and suggest ways in which they could positively contribute to making the group move forward through the remainder of the unit. She explained her process for identifying and resolving this issue in the way she presented it to the focus group:

I then drew an imaginary line on the table with listening at one end and talking at the other. I asked where along the line they would place themselves. I offered that I might put myself at about less than half, so more listening than talking because my role is to help facilitate the conversation and to clarify ideas. (Joy Butler, personal communication, October 23, 2013)

All the group members participated in this activity; Mark and Ben were able to recognize the extent to which they dominated the talking by placing themselves at 90% talking, while others in the group placed themselves closer to 50%. Some interesting responses emerged when Dr. Butler interviewed the group about this activity (Focus group discussion transcript, October 23, 2013):

*Dr. Butler:* “What are the pros and cons of talking in the group?”

Billy: “If we are looking for ideas we need people to talk, so talking is good.”

Troy: “Yeah but the problem is that with everyone talking no one is listening”

Dr. Butler: “Ok, so the con of talking is that people are contributing ideas but then the con is that no one seems to be listening. Are you sure about that?”

Troy: “Well the ones that are talking are not listening.”

Dr. Butler: “OK… so what are the pros and cons of listening?”

Troy: “If you are really listening you can hear some different ideas to think about.”
Billy: “I don’t think that some people are really listening to other’s ideas. I feel that when I talk some people say OK Billy that’s your idea, it’s dumb, and then they move on and my idea is ignored. They haven’t listened to it.”

Dr. Butler: “So you would like people to really listen to you by considering your idea and be respectful toward you?”

Billy: “Yes!”

This discussion centered on the interpersonal skill of active listening, and its importance to the group’s progress. The group identified this skill, or the lack of this skill, as the main issue preventing the group from creating an inclusive game design process. Students were given the opportunity by Dr. Butler to explain how not being heard would negatively affect their social experience and would shut them out of the game design process. In addition, Mark and Ben were able to hear how their actions made other group members feel excluded from the process. Ben noted:

I didn’t know that these guys cared so much about the game; I thought they just didn’t like PE and would go along with what we said to get the game over with…. I guess we have to listen to their ideas to get a better perspective on things (Ben, journal entry #4, October 18, 2013).

Although Ben’s observation still reflects the division between the ME students and the LE students, it nonetheless indicates that Ben was beginning to understand that excluding members from the process was negatively affecting their social experiences.

It became clear that this group session was a critical incident because, by the fifth and sixth sessions, the entire group was more open to listening to everyone’s ideas. As the group worked on improving the flow, inclusiveness, and enjoyment of their game, they added rules to facilitate these aspects, including the idea of adding two balls to the game, which was intended to ensure that all the team members had to be over half in order to score, and the strategy of including the seventh person in the group as a rover so he wouldn’t have to sit out and wait to rotate with the goalie after each goal.
4.1.3.3 Critical Incident 3: Better ways to hear ideas

At some point, after the issue of listening and incorporating the ideas of others, the group came up with the strategy to use an “idea box” as a way to consider the introduction of new rules. I saw this as a third critical incident. The students decided that anyone could write down a rule and put it in the box, and then the group would try these ideas during the game to see if they worked well. Not all of the ideas put into the box were used, but it allowed all of the students to present their ideas to the group. The ME members in the group became more open to “buying in” in this way, and the box eliminated the problem of rules being imposed by one or two members of the group. Ben recognized that the new inclusive game design process worked to the advantage of the game play, and had the added advantage of including all the players:

Adding the new rules to the game made the game have more flow and allowed more people to be involved. At first I didn’t think it would work, but I gave it a chance and I was surprised. I didn’t like all the rule changes, but I really liked the rule which incorporated different balls, this made the game more interesting and I liked the creative aspect of it. Nick made a good suggestion about the over half rule, because this made sure that the goalies were involved. (Ben, journal entry #6, November 1, 2013)

The three critical incidents, the no-dribble rule, the focus group meeting, and the idea box, were three separate but connected events that enabled the group to see the value in an inclusive game design process. Table 3 below summarizes how the rules were added to the focus group’s game. These were significant events that served to improve the social experiences of the students during the IG unit because they highlighted and reinforced social skills such as active listening, valuing the opinions of others, and conflict resolution.

Table 3: Rules added to the game by the focus group

<table>
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<tr>
<th>Added Rule</th>
<th>How was it implemented?</th>
<th>How did it make game more inclusive?</th>
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83
| **Multiple Goals**  
Could shoot at hockey net or cone on top of hockey net. | Through initial discussion in session two as well as trying it out in the game | It gave students an option to score. Students had the ability to either use soccer or handball skills to shoot at hockey net or could go for more points by shooting at cone on top of net. |
|---|---|---|
| **No Dribble Rule**  
Player with ball could not dribble and player had a protective bubble. | Through initial discussion in session three Troy proposed rule (this served as a critical incident) | Encouraged student with ball to pass to other teammates instead of dribble with ball and score. The protective bubble allowed ball handler time to look for teammates. |
| **Adding Two Balls**  
In addition to handball group added rugby ball and both ball were used in the game. | Through decision box followed by trial in game, and then vote. | Allowed more action within game and enabled more players to be involved in the game |
| **Over the Half Rule**  
All offensive players had to be over the halfway line before team could score. | Through decision box followed by trial in game, and then vote. | Stopped students from just throwing long passes to students who were “cherry picking.” As well, forced goalie to be engaged in play as goalie had to be over half as well. |
| **Rover Rule**  
Because the group had seven students, one player was left off, so group decided to make this player the “rover” which meant he stayed on offense for both teams. This made offense easier by allowing more options for ball handler and enabled all students to play instead of having to sit off. | Through decision box followed by trial in game, and then vote. | |
| **Rotate Goalie Rule**  
After every goal, BOTH teams would have to switch goalie. | Through Decision Box followed by trial in game, and then vote | In the first few sessions group was using same students for goalie (LE students) so this rule allowed all students to rotate positions so not just one players would be goalie for duration of game. |

### 4.2 Theme 2: Acknowledging ideas

I can’t remember exactly how old we were, but I think I was about 12, so my brother would have been 10 years old. We were playing basketball in the back alley and I remember it being a hot day in August. At this stage, I was still physically more dominant at any sport we played together so, if my brother and I wanted to play against each other, we had to adapt the rules to make the game competitive.
On this particular day, we were playing a game of two-on-two with some of my friends. Like me, my friends were taller and stronger than my brother so, as usual, he would have to work really hard to compete in the game. On this day, he suggested that, when he shot, we could give him room and not block him so he could get his shot to the basket. We laughed off the idea, telling him that he would have to learn to shoot “real” shots in a game if he wanted to be a good player. But, as the afternoon went on it became more and more apparent that the game was not working. My brother remained at a disadvantage because he was physically unable to get his shot over the head of his defender. Finally, one of my friends said, “Okay, let’s just not jump to block his shot when he gets the ball.” We tried the rule change and the game worked really well. It allowed us to play together and the game became more fun and more challenging for all of us.

Later that evening, I remember walking into the living room to hear my brother telling my father about his day. Although he highlighted the way we changed the rules to include him, he still sounded upset. I couldn’t understand what he was so upset about, given that we’d changed the rules and let him play. It turned out that he was upset because we did not initially give him credit for his idea, and that we laughed it off. I remember him saying that we rarely acknowledged his contributions whether it was in the form of ideas about the game, or during the game itself.

When I talked to my brother about this more recently, he remembered a number of things: that when he played the game, we wouldn’t pass him the ball; that he felt he was a burden to his own team; and, that he was not acknowledged for his ideas. He remembered that there were times when he didn’t feel a sense of belonging when he played with us.

As I reflect on this study, and my professional role as a PE teacher, I have come to the realization that students (and my younger brother) want to be
acknowledged for their contributions to the group. As my brother said, this acknowledgement “of my opinion and my ideas would have given me more confidence, during the game and in life in general” (personal communication, 2013).

The experiences of my brother, as we played games in the course of our childhood, are echoed by some of the experiences of the students in my study. It became very apparent, through student journals and interviews, that being acknowledged for one’s ideas voiced in the process of the game design was very important. This section aims to highlight the different social experiences that this group encountered in relation to “being acknowledged for ideas.”

As the students in the group constructed their game, and determined which ideas worked well, it was not required give credit to individual students for these ideas. As I noted above, a major critical incident in the group process was the acceptance of Troy’s proposed rule to not allow dribbling in the game. The group discovered, by way of the game showcase, that this idea made the game better (i.e., more inclusive and made the game flow). Consequently, Troy felt a sense of ownership over his contribution, saying that it worked well:

The rule to have no one allowed to dribble worked well today in the showcase, it was a rule that I came up with and I remember that we used it in Mr. Sandher’s class for rugby, and I liked it. (Troy journal entry #4, October 18, 2013)

Other members in the group also agreed that the rule worked well and gave credit to Troy, which in turn seemed to give them the confidence to voice their ideas in future sessions. Billy noted that he had his own ideas:

Troy’s rule was a good one today, the one to not let people dribble; we actually got the ball in the game. I have some ideas as well that hopefully Mark can see will work now because they actually listened to Troy. (Billy, journal entry #4, October 18, 2013)
During sessions five and six, after the focus group meeting, students revised their game by adding a few new rules using the “idea box.” A number of these rules came from the LE students, and some of their ideas were voted into the game. Billy and Nick noticed that other group members, even Mark and Ben, were commenting on how the added ideas were making the game better:

I came up with a rule that said that after a goal both goalies had to switch because I hated being stuck in goal for the whole game, the group tried it and it worked so this made me finally feel like they were listening to my opinions. (Billy, journal entry #5, October 18, 2013)

It was so obvious we needed to make the game flow better so I said we should have all the team members be across half before we score, this would force the goalie to not just stay in net. It worked well and Mark and Ben both said they liked it, and it was a rule that was good, usually I don’t have these good ideas in gym class. (Nick, journal entry #6 November 1, 2013)

These passages highlight that when the students’ ideas were actually being used and acknowledged by their fellow group members, it increased their sense of belonging to the group. In addition, when the students felt that their ideas were being acknowledged, they also felt more comfortable in contributing further ideas in the future. As my brother remembered from his childhood experience of playing games with us, this acknowledgement was not so much a matter of personal gain, as it was the sense that one’s contributions are actually considered to be worthwhile by the group, which in turn gives the sense of belonging.

Having one’s ideas acknowledgement was valued by both the LE students and the ME students. Ben, one of the more experienced athletes, wrote that:

The idea to put the cone on top of the net to make another target was mine that I saw in another PE class of mine in elementary school. Other groups liked having more than one goal, it made it more challenging for them. This rule was put in early in the
unit, and a lot of other things changed but this one stuck so I was able to affect the game. (Ben, journal entry #7, November 6, 2013).

Ben’s observation indicates that this kind of acknowledgement—when the individuals propose a rule that works, and their team members like—gives students a sense of ownership over the game, a feeling that, even though this was a collective activity, they had a part in creating it.

Interestingly, John wondered why “can’t PE give credit to students for good ideas, it’s always based on who’s good at the bleep test or sit-ups” (John, journal entry #4, October 18, 2013). This was echoed by Nick, who wrote:

Troy and Billy had good ideas, and yet however Mark and Ben seem to think they have all the ideas, we should get points for these ideas, like from our teachers. (Nick, journal entry #5, October 23, 2013)

It came out that the students thought that PE should be structured by the teachers to give more credit to students who offer creative and thoughtful ideas. Their idea about giving credit had nothing to do with getting better marks, but simply about wanting some form of acknowledgement from their teacher and their classmates when they contributed a good idea.

To summarize, students value acknowledgment for their ideas, especially those ones good enough to be incorporating into the game. Following, I will look at the impact of the team selection process in forming the focus group, and how this affected the students’ social experiences during the game design process.

4.3 Theme 3: The student-selected team selection process

I remember, one afternoon long ago, grabbing my hockey stick and my rollerblades and heading out to the lacrosse box to meet a bunch of my friends to play a big game of roller hockey. Although I was generally good at most team sports, I wasn’t the best at roller blading or hockey; not bad, but not
great. When I showed up there were at least 20 boys gathered, some of whom I knew and others who were unfamiliar, but I did know that there were some very good skaters and hockey players—and I knew that I wasn’t one of them! After warming up for a bit, one of the older boys pointed to the blue line, saying, “Hey let’s go. Line up over here.” There were two boys standing at the center of the line—the two captains who were about to select the teams. I remember, to this day, feeling anxious at the thought that I might be the last boy picked. Luckily for me, one of my friends got picked early and asked his captain to pick me, which he did. I was picked about half way through the “draft.” What I remember most about this incident, though, are the reactions of the last two boys to be picked. One of them was upset enough to pack his things and go home; the other was so dejected that he only played a few shifts and ended up watching from the sidelines for the rest of the afternoon.

The third theme that emerged from my examination of the data was related to experience of the student-selected team selection process, a moment that often produces feelings of exclusion and anxiety. Evans (1988), in his examination of the way in which children picked teams during their recess and lunch-hour soccer games, found that the student-selected team selection process was a “revealing measure of the social status of each child… [and] it contributed to the child’s understanding of self and others, as team games serve as important agencies in the development of self-concept” (p. 102). The IG unit similarly revealed this process to be a negative social experience for certain students; it certainly worked against the goal of creating as sense of inclusion in the group setting.

As the students created their games, they were encouraged to test the rules they had devised by actually playing their game. In order to do this, the game students had to organize their own teams (structured as three against three). Students were not given much direction as to how to go about this, and I did not quite realize until I looked at the data that the team selection process emerged as a site for a negative social experience.
During the second session the group set out to play the game that Mark and Ben, the more experienced students, had created. When it came time to organize the teams, Mark and Ben put themselves on the same team, and chose Nick as their teammate. The rest of the group was surprised by this. John wrote:

I mean why would the obviously two best players go on the same team…. This made the game so not fun, as they dominated and I just don’t see the point, they put all of us who aren’t as good on one team. (John, journal entry #2, October 11, 2013)

Although having the two best players on one team seemed, in the eyes of the rest of the group, like an obvious mistake, Mark’s take was this:

We picked teams using captains, me and Ben, and we tried to pick fair teams. However, when you pick fair teams the game is not as fun and doesn’t flow, so we changed the teams to put me and Ben on the same team so we could see if our game would flow. (Mark, journal entry #2, October 11, 2013)

At this point in the IG unit, the two experienced members in the group had not only essentially created the game, but they had put themselves on the same team, allegedly “to see if the game would flow.” The irony, of course, was that the game did not flow and it was not enjoyable. And, all of the LE members of the group was confused by the decision made by Mark and Ben to put themselves on the same team when it became obvious that this would compromise the game play; as Troy noted, “When the two best players are on one team, the game is a farce, both players kept scoring and we couldn’t keep the ball, so what is the point of the game” (Troy, journal entry #2, October 11, 2013).

When the ME students manipulated the team selection process to put themselves on the same team further created the gap between ME and LE members. All of the LE students felt that the teams were unfairly created by the LE students Ben and Mark to, “…rub it in that they were better as this game than we all were, it makes no sense” (Billy, journal entry #2, October 11, 2013). The student-selected team selection process highlighted the fact that Mark
and Ben did not appear to care how their selections affected the group, a perception recorded by Nick, who wrote that they “didn’t care that the game was not working, or that they were scoring all the goals” (Nick, journal entry #2, October 11, 2013).

Although, as the teacher in this situation, I approached the group to discuss the benefits of selecting equal teams to create a more fair and balanced game, I chose to leave the group to their own devices. This meant that Mark and Ben refused to split up and participate on opposite teams. John describes the event this way:

> After Mr. Sandher came over to talk to us, they (Mark and Ben) just said, ok, here, you can have Nick, and we will play this game 2v4 [two against four]. Troy said, “hey, the game has to be 3v3, and Ben responded with “whatever, let’s try this.” So we did it, but these guys just want their own way, and we just have to go along with it. (John, journal entry #2, October 11, 2013)

The group response, voiced by Nick, indicated that playing two against four was embarrassing: “it humiliated us, they think they are so good they put only two versus 4” (Nick, journal entry #2, October 11, 2013). In the end, the group came up with a structure that would separate Mark and Ben in an effort to make the teams more balanced. They decided that they would use captains to pick the teams.

Although this accomplished the goal of separating Mark and Ben, it created the added anxiety of being picked last. John wrote: “I knew I would be picked last because they think I can’t play this game” (John journal entry #3, October 16, 2013). According to the journals, the remaining team members also heard negative comments as they were being picked, inevitably causing their own negative feelings to surface. John wrote: “I could hear what they were saying, I know I’m not fast or good at this game, but there is no point in saying that stuff when I’m on your team” (John, journal entry #3, October 16, 2013).

Additionally, when the group insisted on separating Mark and Ben, these two simply resurfaced as team captains, which further reinforced the reality that the ME students were
making the important decisions for the group. The LE students felt excluded by the student-selected team selection process, which also meant that they felt excluded from the entire IG process. They quickly made the connection between feeling excluded and humiliated during the student-selected team selection process, and not being included in the game design process. Troy wrote: “First they create the game and now they make the teams, and now they are the captains for the game, this is normally how PE goes” (Troy, journal entry #2, October 11, 2013).

It became abundantly clear, through the student-selected team selection process, that those with greater ability and experience playing territorial games were likely to create teams based on friendship and ability. Other studies have shown similar findings. Chapman and Van Auken (2001), in his study on self-selected teams within a science class, found that “students appear to select teams based on ability and friendship” (p. 150). Lynne and Ratliffe (1999), referring specifically to PE, also note that, “when given a choice, students will select groups according to ability and friendships” (p. 11).

To summarize, the student-selected team selection process during the IG unit, needless to say, caused negative social experiences, individually and for the group as a whole: when the more experienced athletes put themselves on the same team the game suffered, the divide between the ME and LE students deepened, the LE students saw this as another act of exclusion, and it appeared to the others that the ME students did not attend to the negative outcome of their actions.

The remedy, also initiated by the two ME students, to “make it even” and play the two experienced players against the four inexperienced players, caused further conflict and left the LE feeling humiliated. The further remedy to separate the two ME students exacerbated the sense of exclusion and feelings of anxiety, despite the teams being “evened out.” The LE students in the group quickly related the experience of not being chosen, and the negative comments made when the choosing was finalized, to their overall sense of exclusion from the game design process as a whole.
4.4 Theme 4: Relating the IG experience to “Real life”

I feel as if this unit made us deal with problems that we are going to face in real life, and this will help us in the future for when we need to deal with other people in a group at school or at work (Nick, journal entry #7, November 6, 2013).

Despite the negative feelings generated by the student-selected team selection process, the students nonetheless picked up on some other themes. In the process of inventing a team-based territorial game, a number of social experiences emerged which stretched the social skills of the participants, and brought up issues of social justice—all of which took place in the authentic and meaningful context of creating a game together in a small group. The students recognized that the importance of drawing on and refining their social skills, especially those of listening and cooperation; they also had to face the issue of justice, especially the effect of exclusion. Having to reconsider and draw on their social skills eventually allowed their game to develop more efficiently and inclusively.

The students identified their social experiences in the process of reflecting on the unit in their journals and in the interviews. During the final interviews, after session seven and before the final session, the students were asked whether they thought this experience was useful in terms of “real life.” At this point, they reflected on the entire unit and speculated on the final session. Three sub-themes emerged in the student reflections as they related their experience to “real life” situations: (a) cooperation is a helpful skill for the future, (b) decisions can be difficult to make, and (c) listening to other people’s ideas is important.

4.4.1 Cooperation

One of the reoccurring themes that emerged as the students reflected on the IG unit was that they felt the unit allowed them to develop some cooperation skills. Troy wrote: “I would say it’s really useful because now we know the concepts of cooperation with others and that’s probably the strongest point in this activity” (Troy, Interview 2 October 11, 2013). Mark stated:
Yes it’s a good experience in working with others. You need to be able to work with others for the rest of your life so you might as well learn when you’re younger than older. And you’ll have challenges when you’re older if you don’t know how to work with others. (Mark, interview 2, October 18, 2013)

The students appeared to value the necessity for cooperation, and acknowledged that learning cooperation and working with others would help them in the future. The “future” was variously identified by students, where some saw it as high school, others as the post-secondary stage, and still others as the time when they would move on to a job or profession. The group by then knew first hand that this skill would be important for the future because they saw that, when the group finally cooperated, they made more progress with their game. Troy wrote:

Cooperating is so important in this process and I think elsewhere because this is so vital to getting things done…[and] it was good to get people to cooperate and just listen to each other, and this will help us in the future for teamwork and school. (Troy journal entry #7, November 6, 2013)

John was more candid: “Just so when they graduate from high school they can work with other people and not argue with everybody all the time.” (John, Interview 2, October 18, 2013)

4.4.2 Making decisions

’Cause you often make a lot of decisions in life and you need to know how to do it. (Ben, interview #2, October 18, 2013).

As the students related their experiences in the IG unit to “real life,” they identified that decisions were hard to make during the game design process. They remembered, from the first two sessions when they had to decide on the core concepts for their game, the challenge of making what they saw as hard decisions. John wrote that, “the biggest challenge was first coming up with the beginning idea because everybody was kind of arguing and then probably
doing a few changes to make it different (John, interview #2, October 18, 2013). Mark echoed these comments when he was asked in the final interview about the biggest challenge of the unit: “probably getting everyone’s ideas together to make the base of the game and really confining the game and deciding if you wanted to do something or not do something (Mark, interview #2, October 18, 2013).

Despite the fact that the first two sessions resulted in conflict and frustration, the students nonetheless felt that there was value in making the tough decisions, especially as this experience might help them in the future. Nick saw this in terms of future career endeavours:

   This unit could help us because teachers are always telling us that all jobs will work in teams and this was good because we had to work through stuff, like hard decisions had to me made. (Nick, journal entry #7, November 6, 2013).

Others related the experience of making tough decisions in the course of the IG unit to current aspects of their life. Mark wrote that “it was hard to get everyone to agree on the changes and decisions, but this is what it is like on my hockey team and other groups because it is hard to get people to agree” (Mark, journal entry #7, November 6, 2013).

I propose that the process of making these “tough” decisions gave students the opportunity to develop their decision-making skills in an authentic situation. Students observed that the IG unit was unique in the school setting in as much as it allowed them the freedom to make some difficult decisions that would have a direct impact on the success of their game. The following exchange (interview #2, November 6, 2013) between John and the interviewer highlights this point:

   Joy: “Why do you think that’s useful to learn?”

John: “Just so when they graduate from high school they can work with other people and not argue with everybody all the time.”

   Joy: “You don’t learn this in any other subjects?”
John: “Not that I can think of…we sort of learn about it from the textbook and overhead slides in other subjects.”

Troy related the difficult decision-making process to the functioning of government:

This kind decisions are made by the government, they vote and then go with the decision that is majority…. We learned about this in grade seven with government in socials, and now I know it’s tough. (Troy, journal entry #7, November 6, 2013).

These comments indicate that students were making connections to what they learned in other classes to aspects of the IG unit, demonstrating their ability to contextualize skills such as the decision-making challenges they encountered in the unit. Others observed that the process of working through conflict and having to make decisions together created a sense of familiarity and built group cohesion.

In conclusion, relating the “tough decisions” that were made in the course of this unit to “real life” was something the students valued; and it was an experience from which they could usefully extrapolate to imagine their future at university, in their careers, and in playing other sports. In addition, the group realized that both PE and IG gave them the freedom and opportunity to make these decisions in contrast to other classes in the school setting.

4.4.3 Listening

Let everybody talk…least I hope they learned that. I did. (John Interview 2, October 18, 2013)

The members of the IG focus group found that listening was an important skill, not only because they eventually realized how important it was for developing their game, but they saw it as something that would be useful in “real life.” They found, at the outset of the unit, that everyone was so interested in proposing their ideas and thoughts that no one was actually listening. Billy wrote:
Sometimes when you get ideas, all the other people have their own ideas and then they disagree with everybody and they don’t make any progress because people are just arguing and shouting, hollering, getting agitated and there’s no actually decision being made. So you need to be listening to others and thinking about others ideas. (Billy, interview #2, October 18, 2013)

Once the focus group realized their difficult, as a group, in hearing ideas from each other, they found that, by establishing a structure to allow ideas to be heard, in this case an idea box and a talking stick, they opened up possibilities for listening to occur. In addition, the focus group meeting reinforced their understanding of the importance of listening in order for the game to move forward in a positive way. Ben actually identified himself, in the course of a listening exercise, as someone who needed to listen more. He wrote, “it was good to have the group session because I think for me the listening aspect was better (Ben, journal entry #7, November 6, 2013). Troy reiterated this: “we tried to have one another listen and consider before they actually speak as we discussed last week in the conference room” (Troy, interview #2, October 18, 2013).

As it turned out, when the group members listened to each other’s ideas the game was able to develop and the group was then able to create a game according to the principles set out, i.e., a game that was inclusive, safe, and fun. They also realized, specifically, that by listening to everyone’s ideas there came an increased chance of discovering good ideas. Mark wrote:

So you want everyone to have a good say about the game…and maybe they have a better idea than you so you want to listen to what they can say. And they can help to the group. (Mark Interview 2 October 18, 2013)

And, they were able to conclude that listening made people feel that they were a part of the group. Mark wrote: “You don’t want anyone to be hurt by not saying, by not having enough say in something” (Mark, interview #2, October 18, 2013), echoed in John’s journal, “I think we understand how to work together more. We know that we should listen more and talk less” (John journal entry #2, October 11, 2013). The students, of course, also found that “you
have to listen to others but not everyone’s idea is good” (Ben, interview #2, October 18, 2013). This shows that students were able to recognize that, while it was not possible to use everyone’s ideas, listening to each other was nonetheless important for establishing a sense of connection and avoiding feelings of exclusion.

In addition to realizing the benefits of listening, the students also realized that listening as a skill would be useful, not only for their game, but in “real life” situations in the future. Students commented that successful group work would be useful through the remainder of their schooling and later in life. Nick wrote: “Listening to everyone made our group easier to be with and when we do group stuff in other classes or in university we can remember to listen” (Nick, journal entry #7); Troy wrote: “listening is something that can help me in getting a job in the future because bosses want people who can listen to instructions, not someone who will just want to talk” (Troy, journal entry #7, November 6, 2013).

4.5 Accuracy of findings

4.5.1 Reliability

The reliability of any study rests in the extent to which it can be replicated by other researchers using the same methods (LeCompte & Preissle, 1993). There are two aspects to question of reliability which will affect the results of a study: external reliability and internal reliability.

4.5.1.1 External reliability

External reliability is determined on the basis of the researcher's status or position with respect to the subject of the study, as well as choices made in the selection of informants, the social situation and conditions influencing the study, the analytic constructs and premises brought to the study, and the methods used to collect and analyze the data. According to LeCompte and Preissle (1993), the social relationship between the researcher and the participants is very important and requires that the researcher’s role and status in relation to the group is clearly identified. In this study, I acted as both teacher-researcher. My role
included my own participation in a wider study, as well as that of classroom teacher to the students participating in this study.

Replication for this study would require that the teacher-researcher be working as a physical education teacher in a mainstream classroom setting, and that the lesson plans set out in Appendix D, and the student handout set out in Appendix E be followed accordingly. The informants for this study included myself as the teacher-research, a number of Grade 8 boys, the principal investigator and a number of research assistants who worked in conjunction with the wider study. The physical education classroom, situated in a multi-cultural, mainstream school provided the social context for the study, specifically the gymnasium setting in which the students experienced the process of participating in the IG unit. These are all variables that can be replicated, with the exception of the particular cultural background of each individual student.

A unique aspect to this study was the focus group meeting/interview that arose out of a particular difficulty encountered by the focus group approximately halfway through the unit, where the principal investigator and I determined that a group meeting, led by the principal investigator, would be useful. While this event would be difficult to replicate exactly in future studies, it could nonetheless be usefully structured into a study with the classroom teacher leading the meeting, thereby providing an approximate replication.

Finally, external reliability depends on a clear account of how data was collected and analyzed. Without this, both the reliability and the validity of the study are compromised. I have described here the questionnaires, the focus of the interviews, and the observation techniques integral to the research design, which I believe give this study a reasonable measure of external reliability. See Chapter 3.4.6 for a detailed account of the way in which the data were collected, and a step-by-step explanation of the data analysis. See also Appendix G and H which include the interview questions and journal prompts that were used. This study focussed on territorial games, a single category out of the five possible game categories, which resulted in lessons that had a specific focus, a feature that will facilitate replication and enhance the reliability of a similar study.
4.5.1.2 Internal reliability

Internal reliability takes into account the extent to which multiple observers are likely to agree that the events, phenomena, and interpretation occurred as they were reported (LeCompte & Preissle, 1993). In order to strengthen the case for internal reliability, the principal investigator of the wider study was present for two of the sessions of the IG unit undertaken for this study. During these two sessions, she was able to observe and verify the extent to which I was implementing the IG unit as we had planned.

4.5.2 Validity

The following sections will describe the methods used to ensure the validity of this qualitative research. The validity of a study is dependent on the accuracy and dependability of the instruments used and observations made in the process of conducting a qualitative research inquiry (Patton, 2002). To ensure the validity of this study, the following strategies were employed: (a) triangulation of data sources, (b) member checking, (c) clarification of the researcher bias, and (d) describing the role of the teacher-researcher.

4.5.2.1 Triangulation

Triangulation involves combining two or more views, approaches, or methods in an investigation in order to get a more accurate picture of a phenomenon. One of the most frequently used methods of triangulation is to incorporate multiple sources of data, e.g., interviews, observations, and journals. This research combined and compared the data taken from interviews and journals to ensure the quality of the data; the journals provided a way of checking what was reported in the interviews, and similarly the interview content was compared with students’ journal accounts. Also, by comparing the experiences of the students, as recorded in their journals, to their responses to the interview questions, I was able to build on the strength of each type of data collection and to minimize the weaknesses of any single approach.
4.5.2.2 Member checking

After both the interviews and journals had been transcribed, the participants in this research study were asked to make sure that the transcripts accurately reflected what they were trying to express in both the interviews and the journals. This cross-checking helped to ensure both the validity and the truth value of the data.

4.5.2.3 Clarification of researcher bias

In Chapter 3.2.2 I explain in detail the inherent bias of this researcher. Bias can easily lead to a misinterpretation of the data and result in erroneous conclusions, in spite of the thoroughness of the research. By examining and explicitly addressing my bias, I set out to enhance the validity of my research.

4.5.2.4 Role as the teacher-researcher

In this study, all but one of the participants (i.e., the principal investigator of the wider study) were vested in the school setting. However, my role as teacher was extended to include the role of researcher. This insider-outsider perspective had the potential to be beneficial in the sense that students knew me well and were inclined to behave normally and naturally in my class. On the other hand, it is also possible that some students may have hesitated to express to me their negative feelings about their experience with the IG process, perhaps fearing a negative impact on their grade for the course. Although I took care to assure my students that (a) their honest opinions were valued, and (b) that I would not be looking at the data until their term marks were finalized, they were nonetheless free to decide what and how much to reveal. Finally, the focus group meeting held after the fifth session was conducted by the principal investigator. It is possible that, given that the students did not have a relationship with the principal investigator, this situation may have prevented some students from sharing the full extent of their thoughts. Added to this, the fact that the meeting was conducted in a group environment may also have prevented some students from fully sharing their true feelings. This may also have occurred had I, as the classroom teacher, conducted the meeting,
potentially inhibiting the group and compromising their ability to fully share their criticisms of the unit, or of other students in the class, for fear of repercussions for the duration of the school year.

4.5.3 Generalizability

The term “generalizability” refers to the degree to which the findings can be generalized from the study sample to the entire population (Polit & Hungler, 1991, p. 645). Qualitative generalizability is useful only in a limited way in qualitative research since it is not the intent of this type of inquiry to generalize the findings to individuals, sites, or places external to those being studied (Creswell, 2008). This holds true for my research study as well, given that the focus group consisted of only seven students—a very small sample size. While the seven students who shared their social experiences during the IG unit may well share traits with other Grade 8 boys engaged in PE, it is not possible or reasonable to generalize their experiences to all Grade 8 boys likely to participate in PE. Additionally, this study looked only at the experiences of boys, and it is therefore not possible to generalize these findings to all PE students given that my inquiry did not take into account the social experiences of girls. At the same time, even though the nature of my research question is specific to the experiences of these students, this same design can readily be used for similar research inquiries.

4.6 Conclusion

This chapter looked the four themes that emerged out of the analysis of the student interviews and journals. I have used examples from these sources to illustrate how individual students in the focus group interpreted various aspects of game design process in the course of the IG unit. In the following chapter, I will analyze these themes using a complexity lens, and I will outline how the conditions of complex emergence can be found in the way in which the social experiences developed in the process of working through the IG unit.
Chapter 5: Discussion of Results

The purpose of this study was to explore the lived social experiences of grade eight boys engaged in the process of inventing a game in the setting of a physical education IG unit. This study was structured to observe the social interactions of these students as they worked collaboratively within small heterogeneous groups. In the course of this unit, students encountered situations that caused conflict in the process of creating a game which required that all group members were included. These situations provided the students with the opportunity to develop social skills in an authentic setting, particularly with respect to resolving conflicts, making decisions as a group, and listening. In the process of the unit, issues such as social justice, human diversity, and inclusion were addressed.

The previous chapter set out the results of the study, and identified the four major themes that emerged from the data: (a) inclusion and the decision-making policy; (b) acknowledging ideas; (c) the student-selected team selection process, and (d) relating the IG process to “real life” situations.

The following section employs a complexity lens to provide further insight into the results—by underlining the conditions of complex emergence that were present in the IG unit, and by indicating the ways in which these conditions were established in the larger study. I will weave in my own memories of playing games as a child, with my brother and my friends, as a way of reflecting on the experience of inventing games, and as a way of understanding the social experiences of the students as they engaged in this study.

5.1 Understanding IG using complexity thinking

If education is about fostering the emergence of learning, of creativity, of imaginative and critical perspectives, then educators would be fair in asking of complexity theory how we might set about establishing, or at least contributing to the establishment of, the conditions, insofar as it is possible to influence those conditions, for emergence to occur. (Mason, 2008, p. 47)
Mason’s (2008) observation sets out what Davis et al. (2006) identify as the “conditions for complex emergence” (p. 192). More specifically, these are “a set of elements that complexity researchers have studied over the past few decades in their efforts to...prompt classroom collectivity...[in order] to give rise to more complex, robust, capable wholes” (p. 192). The wider study in which my study is situated is grounded in the theoretical framework of complexity thinking.

In the course of my participation in the wider study, as a teacher-researcher and as a graduate student within the TGfU cohort, I was challenged to consider the ways in which complexity thinking could inform my teaching practice. I came to understand that, by establishing the conditions for complex emergence within my classroom, I could foster the emergence of learning within collectives. Over the course of three years, our research group—which included a total of six teacher-researchers along with the principal investigator, Dr. Joy Butler—developed an IG unit that was structured around three specific conditions that were designed to prompt complex emergence: (a) the simultaneity of diversity and commonality among agents, (b) enabling interactions through decentralized control, and (c) enabling constraints, i.e., opening possibilities by limiting choices.

I used these three conditions in my study to stimulate complex emergence within the collective (my focus group), and I fostered the conditions needed for creating memories and feedback loops. Following is a list of the constraints used to stimulate the conditions for complex emergence in both studies, my own and the wider study.

(1) Students were placed in groups that included a diversity of experience with respect to playing games, and encompassed differences in cultural and ethnic backgrounds. In this way, a situation was created that would allow diverse opinions to bump together.

(2) Students were required to create and implement an inclusive decision-making policy. In this way, they were confronted with an enabling constraint that would allow diversity to be accommodated.
(3) Each group was required to showcase its game to the entire class, thereby exposing the other groups to different ideas that they might incorporate for their own games. In this way, a form of decentralized control came about and ideas were modified by way of neighbourly interactions and feedback loops.

(4) Each group was required to write down the ideas of all the participants in order that the group could remember (and forget) those elements which worked and those which did not. In this way, the group created memories that allowed their game to develop into the immediate future.

By setting out these conditions as the teacher-researcher, I attempted to affect the different levels of learning systems, i.e., individual understanding and classroom collectivity; it was my intention to engage these two learning systems simultaneously, following from Davis et al. (2006), who noted that the “collective is not just more intelligent than the smartest of its members, it also presents occasions for all of the participants to be smarter” (p. 192).

The IG unit can be seen to provide the several conditions necessary for complex emergence, conditions that were structured into the unit in order to allow diverse ideas to emerge. The complexity thinking conditions that will be discussed in relation to this study are: (a) enabling constraints, (b) internal diversity, (c) neighbourly interactions, (d) decentralized control, (e) feedback loops, and (f) creating and forgetting memories. I propose that, with the presence of these conditions, the IG group can be understood as a complex unity—as an adaptive, self-organizing system.

The following sections will set out and discuss the social experiences of the students, and how these are connected to the necessary conditions for complex emergence. In keeping with Hopper’s (2011) approach to understanding his own development as a tennis player in terms of a complex learning process, I will incorporate my own reflections and recollections (in italics below). In this way, I will relate my childhood memories of playing games with my younger brother and friends, and show how my mother, by introducing enabling constraints, established the conditions for complex emergence.
5.2 Enabling constraints

Davis et al. (2008) note that complex systems are rule-bound, but that the rules determine only the boundaries of the activity, not the limits of possibility. The IG unit was organized around specific constraints, including the requirement to include all group members within the game construction process using the group decision-making policy as one of the “rules.” However, as limiting as these constraints might have seemed to the students at the outset, these constraints also “defined a territory that was rich with possibilities” (Davis & Sumara, 2008, p. 49). The IG unit was carefully developed to ensure a “delicate balance between sufficient randomness to allow for flexible, varied response and sufficient organization to channel such responses into coherent collective activities” (Davis & Sumara, 2008, p. 47). The students were required to create and implement a decision-making policy which would incorporate constraints to ensure that all students in the group had input into the construction of their game: (a) no one could be excluded from the discussion (although individuals were not required to contribute), and (b) rules could not be imposed by a single member of the group (following from Butler, in press).

As a child, my mother did not establish an official decision-making policy, but she did remind all of us to include everyone in the game (including my younger brother!). She also told us that her parents (my grandparents) stressed inclusivity and fairness, and so she saw it as her responsibility to pass these values on to us. She would ask us why we wouldn’t include anyone that wanted to play. Her most effective way of teaching and parenting was simply by modelling these values. My mother’s approach to people—whether to a family member or someone outside the family, was welcoming and inclusive.

It became clear, as I examined the journal entries of the students in the focus group, that the group initially found making decisions for their game—within the constraints that were given—to be very challenging. When the focus group first attempted to use its decision-making policy it found itself faced with an overabundance of ideas, and it then had to
contend with conflicting opinions about these ideas. As the frustration grew, the constraints seemed to be more constrictive than enabling.

As a child, I encountered numerous occasions when I felt that trying to include my younger brother in the game, or in the decision-making process about how the game was to be played, was far too much work and it seemed to me that it would be much easier just to make him go inside. However, when this happened, my mother (reinforced by my father) would explain to us that we needed to find a meaningful way for my brother to compete or else the game could not continue.

It was not until the first “critical incident” occurred that the focus group started to realize the benefit of including all the members in the game design process. The “critical incident” came about when Troy—a less experienced player who had by then tired of Ben and Mark (the more experienced players) taking over the game design process—proposed a rule that would not allow dribbling. The focus group had also, meanwhile, discovered by watching other groups demonstrating their game at the showcase (in the fourth session), that the “no dribble rule” made the game more inclusive and enjoyable.

The interesting aspect of this rule was that it was an enabling constraint created by a student within the group rather than one created and imposed at the outset by the teacher. Butler (in press) observes that students “have an almost uncanny knack of choosing constraints that are not only developmentally appropriate and suited to their current level of skill, but also serve to draw attention to their social, physical, and affective needs” (p. 10). This certainly turned out to be true in this case. The innovation came about because Troy, who was not as proficient as Mark and Ben at dribbling the ball, found that whenever he got the ball it was immediately stolen from him as he attempted to dribble it. In addition, the less experienced students saw that they rarely got possession of the ball because Mark and Ben could easily dribble past their defense and score.
To deal with these difficulties Troy established an “expansive” enabling constraint, which Davis et. al, (2006) identify as a constraint which dictates “what might be done in part by indicating what must not be done” (p. 193). Troy proposed that, if students were not allowed to dribble, there would be more opportunities for more passing, and this in turn would make the game more inclusive. This rule not only made the game more challenging for the more experienced students because they had to pass and use off-ball movements to get the ball back, but it made the game more inclusive for the less experienced students because the ball was passed to them more often.

While this student-created enabling constraint improved the inclusivity of the game, it was equally important that the unit was structured to include the teacher-created enabling constraint (the decision-making policy), without which the students would have had fewer opportunities to have their ideas considered. As a teacher, this is a balance I strive to develop daily: a student-centered and teacher-facilitated environment.

As a child, when I played with my brother and neighbourhood friends, we would constantly modify the rules to make the game more inclusive for my younger brother. For example, when I played “21,” a popular basketball shooting game, we decided that after I made a basket I would shoot a three-point shot while my brother would be allowed to shoot a free-throw shot (i.e., closer to the hoop). In addition, I would be required to shoot the ball with my opposite hand, and all my shots were not allowed to touch the rim but had to go directly into the net. These rules, essentially enabling constraints, made the game more challenging for me while still allowing both me and my brother to take part in the same game.

Similarly, the IG unit was carefully structured to provide the conditions for complex emergence. One of the conditions for complex emergence, if not the most important condition, was providing for an enabling constraint which required that each group create and implement a decision-making policy. This policy ensured that all students would have the opportunity to have input into the game design. Early in the game construction process,
during the first two sessions, the group found itself faced with an oversupply of ideas. This caused “gridlock” and brought a halt to the process of creating their game. Consequently, the ME students decided, on the basis of their greater experience playing territorial games, that they would unilaterally create the game. In response, Troy countered with an enabling constraint—the “no dribble” rule. This rule simultaneously made the game more challenging for the ME students, and made the game more inclusive for the LE students.

5.3 Internal diversity

As noted above, the groups for this unit were partially selected by the students and partially selected by chance using an “out-of-the-hat” number-matching system. The reason for doing it this way was to increase the chance of mixing together individuals of diverse abilities, backgrounds, and experiences. The focus group for this study included a range of experience with territorial games but, for the purposes of this study, the students were identified either as having less experienced (LE) or has having more experience (ME) (see also Chapter 3, section 3.3.3).

The following section will use a complexity lens to illustrate how the diversity within each group contributed to the social experiences of the group members in the process of engaging in the IG unit. Prior to this, I will draw on my own encounter with diversity in a collective setting, and the way it was transformed into an asset in the learning process:

Early on, as children, my brother and I both played cricket for hours on end. We got this from my father, an immigrant from India who came to cricket naturally, in part because it was an important sport in India. We would get a lot of weird looks from people as they walked by and saw us playing “street” cricket in the back alley. We would have to adjust the game when our friends, who did not play cricket, came over and wanted to play, and we had ways of making the game more enjoyable for all of us. For example, some of our friends were baseball players so we would add rules that would allow them to wear gloves, and we added two bases so that we had four bases to run to
instead of the two used in cricket. In time, and with more input from other children who came to play, we added rules that had nothing to do with baseball or cricket; for instance, if a player was able to hit the cricket ball into the neighbour’s basketball hoop the player would get an extra six runs. In essence, we used the diverse sporting experiences of all of the children to create games that ended up being more dynamic and more engaging. Our inclination to include players with different experiences with batting and fielding games, and the explosion of creative rule-making that came out of this, all came about because of my mother’s insistence that all children had to be included in the game—which also ensured that cultural and athletic diversity would be incorporated along the way.

Complexity theorists agree that one of the most important features of an “intelligent” system is internal diversity (Mason, 2008). Davis and Sumara (2006) emphasize that it is this diversity which allows a system to respond with flexibility:

The collective’s range of intellectual possibility depends on variation of the experiences and perceptions of its members. Pools of internal diversity enable a collective to respond flexibly to shifts in circumstance, both internal (among member agents) and external (with the context) to the system. (p. 45)

The IG group had the potential to draw on this diversity to create a game that could accommodate the different ability levels of the individuals. Hopper (2012) explains that, within the IG process, “diversity within any group is an asset; the game will become more dynamic and engaging if it accommodates all abilities” (p. 85).

It may seem that, by simply placing students with diverse abilities and experiences together, an “intelligent” system might automatically form as individuals draw on the diversity in their group, but as the focus group for this IG study demonstrated, this is not necessarily the case. The IG group was quite diverse in terms of athletic ability, experience playing territorial
games, and cultural background. This diversity, however, brought on a “gridlock” of ideas in the first two sessions, prompting the ME students to ignore the decision-making policy and unilaterally create a game without input from the LE students. In so doing, the ME students essentially neutralized the asset of diversity within the group, and did not use the “mixture of abilities and prior experiences in [the group] along with the randomness of prior experiences that could have allowed a unique game to develop” (Hopper, 2012, p. 85).

As the group struggled to incorporate the diversity of the group, it was imperative for structures to be in place to ensure that diverse interests and abilities were well represented. Davis and Sumara (2006) emphasize that for diversity to become generative in a classroom setting, the teacher must first acknowledge the presence of diversity and then ensure that several conditions are in place. The teacher must remember that diversity is present; the teacher must create opportunities for this diversity to be represented; and the teacher must create conditions whereby the collective takes some responsibility for making use of this diversity. (p. 46)

As the teacher-researcher in a multi-cultural setting, one that includes many ability levels, I am daily confronted with diversity. In this unit, I saw how diversity could be used to encourage learning in the context of creating a game, by having the students create a decision-making policy that forced them to include all the voices in the group. Initially, even though the group knew that they were required to include all the group members in the game design process according to the decision-making policy, this took time to come about.

The process of introducing and testing Troy’s “no dribble” rule proved to be an instrumental critical incidents for having the group take diversity into consideration and, in the process, to also see the value in doing so. The group adopted Troy’s “no dribble rule” by way of a democratic process and tested it in the course of showcasing the game. Although Troy had less experience playing territorial games, he coaxed the group into considering his rule by saying he had an idea for the game, and by proposing that the group should, at the very least, try his rule out and then vote to see if it should be inserted into the game. The group did try
out the rule and subsequently voted for it, seeing that it improved the game and was in keeping with the rule for the showcase.

It was during this key period of trial and review where the group, especially the ME students, found that the new rule made the game more challenging and enjoyable. At this juncture, a shift in the decision-making process occurred as the group began to realize the potential of listening to diverse opinions. It is worth noting that, until Troy spoke out, the LE members had resigned themselves to the idea that the ME members would create the game. When Troy confronted the ME students, challenging them adhere to the decision-making policy, diversity was allowed to surface.

Although the “no dribble” rule prompted the group to take advantage of the diversity in the group in this instance, the experience did not persist through subsequent sessions. Despite the experience of the showcase session, where the “no dribble” rule was lauded by other groups as a rule that made the game better, the ME members of the group were nonetheless disinclined to change any other rules. Consequently, frustration grew among the LE members; they could not understand why the ME members were reluctant to listen to other ideas. At this point I agreed with the principal investigator of the wider study to hold a focus group meeting to help the group identify and discuss their issues. I identified the outcome of this meeting as the second critical incident (see 4.1.3.1 “Critical incident 2”).

Davis and Sumara (2006) emphasize that one of the conditions that must be in place for diversity to become an asset within a group is that “the teacher must create conditions whereby the collective takes some responsibility for making use of this diversity” (p. 46). In this case we, as teacher-researchers, took on the task of creating a condition where the collective, in this case the focus group, could be made to realize a sense of responsibility. The general outcome of the focus group meeting was that students came to understand that they needed to listen more and talk less. The meeting also gave a forum for the LE members to express their feelings of exclusion from the game design process, and allowed the students to consider taking more responsibility for actively listening to each other’s ideas as a way of accommodating the diversity in the group.
In the sessions remaining after the focus group meeting, the group came up with the strategy (with some assistance from the teacher) of using an “idea” box where students would write down ideas for the game, agreeing that they would then try the ideas out in the game. This allowed the group to draw more actively on group diversity, with the added benefit of acquiring other rules to make the game more challenging for all. The appearance of the “idea” box as a student-initiated innovation in keeping with the decision-making policy illustrates a point made by Davis and Sumara (2006) that “one cannot impose diversity from the top down…diversity cannot be assigned or imposed, it must be assumed” (p. 45).

5.4 Neighbourly interaction

I have considered the two conditions necessary for complex emergence—those of enabling constraints and internal diversity—and how these constraints affect the social experiences of the students within this study. A third condition that must be present for complex emergence is that of neighbourly (or neighbouring) interactions, which I will now consider, with particular attention to the impact of these interactions on the social aspect of the game design process.

Davis and Sumara (2006) point out that, while “it seems unnecessary to suggest that there must be neighbour interactions in order for complex possibilities to emerge,” what actually constitutes a neighbour may be less obvious (p. 44). One would imagine the neighbours, in a social grouping such as the IG focus group, to be the individuals themselves but, while the individuals are important, Davis et al. (2008) argue that they may not be as important as commonly believed. In order for new insights to be produced within the knowledge-generating collective, Davis and Sumara (2006) conceptualize neighbours as “ideas, hunches, queries, construals and other manners of representation,” or as knowledge that “emerges not simply amid the juxtaposition of bodies, but amid the juxtaposition of interpretive possibilities; the neighbours in a knowledge-generating collective must be ideas” (p. 46). Davis et al. (2008) emphasize that, as these ideas are generated within in a knowledge-generation moment, in order for complex emergence to come about it is critical to provide the opportunity or the structure to allow these ideas to “bump together” or “stumble across
one another.” They go on to say that, given an appropriate setting the hope is that, as these ideas “bump together,” that the “juxtaposition of various representations might trigger other interpretations, which when presented might trigger still others” (p. 199).

The IG unit was intentionally structured to allow students, in small groups, to propose ideas for their game, try these ideas out, and then decide which ideas to keep and which ideas to dispense with. The imposition of the structure of the decision-making policy on the game design process was intended to ensure that the students would have an equal opportunity to propose ideas for their game.

As part of the process of generating ideas, members of the focus group were required to invent bridges between their current experience of playing games and their own remembered experiences of playing games, and this process allowed the students to bring a unique perspective to the group. In one instance, a student in the focus group proposed the idea of having multiple goals, remembering that as a younger child he and his friends would create games with multiple opportunities for scoring points, a feature that he enjoyed because it kept him engaged. When his group was creating the scoring areas or goals in the course of this IG unit, he contributed this idea and, on testing it, the group found that it worked well.

5.4.1 Connecting ideas

The IG group, after some early resistance, honoured their decision-making policy to allow all students a chance to contribute to the game design process. Consequently, the “no dribble” rule proposed by Troy resulted in a more inclusive and enjoyable game. It also triggered the “over half” rule (where the goalies were required to rotate after each goal), making the game more inclusive for the goalie. Similarly, the “showcasing” of the games midway through the unit (in the fourth session) proved useful, allowing groups to obtain ideas from the other groups. The structure was in place, not only to allow one idea to bump into another idea within the group, but to allow groups to “stumble” on ideas generated by other groups. As John noted, “the over the half rule our group used was inspired by group two, they used this
and I thought we could make our game better if we used this as well” (John, journal entry #5, October 23, 2013).

5.5 Decentralized control

My parents had a considerable impact on the formation of the values which I bring to my teaching practices. My mother was able to remain at home while we were growing up, which meant that she was always there to make sure we played cooperatively and safely. However, she did not teach us how to play in a direct, “here, let me show you” way, nor would she constantly interfere in our games to get her point across. Instead, she insisted on instilling the values of inclusion and fairness, and she led by example in her dealings with people. When we played games in the backyard, my mother would allow us to “figure things out,” explaining later that she wanted us to have the ability to deal with problems in the future “without having mommy around.” This form of decentralized control gave us the necessary freedom to develop a good ability to solve problems on our own, and our social environment opened out to be more participatory and inclusive as a consequence. My mother would often have to remind me that, just because I was older did not mean that I had a greater right to make decisions. She emphasized early on that my brother was to have an equal say, and that his opinion had value.

The fourth condition of complex emergence that informed the structure of this unit is the notion of decentralized control. Davis and Sumara (2006) found, in their review of the behaviour of learning clusters (small groups), where students were required to work collaboratively, that “an important dynamic can be seen to be at work: no one individual was ‘in charge’ of the groups. They organized themselves around the assigned work” (Davis & Sumara, 2006, p. 47). They cite Varela (1999) to elaborate their point:

The whole does behave as a unit and as if there were coordinating agents present at its center…. [A coherent global pattern] emerges from the activity of simple local
components, which seem to be centrally located, but is nowhere to be found, and yet is essential as a level of interaction for the behavior of the whole (p. 53).

Davis et al. (2008) bring attention to the notion of “center,” an important issue in this consideration of decentralized control, i.e., “more precisely, the assumption that the center must be a person or an object.” They note that a move from a centralized network to a decentralized network is not simply “shifting attentions, rather it is about decentering or displacing such attentions” (p. 200).

The IG unit was deliberately designed to have groups of students and ideas come together, at different levels and, as such, can be seen to approximate a decentralized network. The network evolved in this way: students began the unit by working in pairs to create an inclusive decision-making policy; the pairs were then placed in larger groups (with a total of six or seven members), where they constructed a decision-making policy based on the ideas that were generated by the original pairs. Finally, all the groups came together to showcase their games, thereby giving the students an opportunity to acquire ideas for their own game. I propose that, following Davis et al. (2008), at every level of this unit (the pair, the small group, the entire class), the center was not a teacher or a student but an emerging possibility.

The unit was structured to ensure that groups did not have a coordinating agent; rather, the intention was that students would organize themselves around the assigned work, which was to create a territorial game under the conditions set out by the teacher. However, early in the unit the IG focus group was confronted with a situation where the ME students essentially moved into the role of coordinating agents for the group. It was during this time that the group experienced a certain degree of conflict and frustration which negatively affected the social experience of the LE students. It was not until two “critical incidents” had been experienced by the group that it was able to move on and successfully design a game that included all the group members. It became apparent that the group worked more cooperatively, and was able to take advantage of the diversity within the group, when it could carry on without a coordinating agent(s). That is, when the members were able to organize themselves around the goal of creating a game without having an individual (or individuals)
“in charge” of the group, they were able to move on and develop a game that was inclusive, challenging, and fun. This supports the notion of an “intelligent” group, as imagined by Davis et al. (2008), where groups that are productive and innovative tend also to be decentralized. In contrast, Davis et al. argue that groups with a hierarchical structure tend towards rigidity and, if they are subject to a central decision-making process, tend to make inappropriate decisions and tend also to move more slowly to make decisions.

In this study, each group in the IG unit was given control over the creation of their game and was not to rely on the teacher for help constructing their game. This decentralized structure was also useful to me as a teacher because it allowed me to circulate between the groups and provide them feedback. In the process, I was able to relay the various ideas that arose in different groups and introduce them to other groups having similar problems. In this way, the decentralized structure opened up the possibility of transmitting ideas through a network.

In summary, the IG unit was organized to allow possibilities to arise through neighbourly interactions which in turn were enabled by a decentralized structure. The unit began by grouping students participants in pairs; these pairs were subsequently placed in small groups, and these groups in turn presented their games to the class. In the process, the students discussed possibilities at various stages, and acquired ideas along the way to help design their own game and finesse their decision-making policy. I propose that, at the center of each stage of the process, there was an emergent possibility and not, as might be expected, a teacher or a student acting as a “coordinating agent” (once the kinks were worked out). Instead, the students eventually organized themselves around the assigned work, which was to design a game that included all members of the group. Initially, when the ME members of the group tried to “take control,” the group faced conflict and frustration. However, as the group realized the potential for developing a better game, by listening to the contributions of all group members rather than having one or two group members “in charge,” it worked more cooperatively and this in turn had a positive effect on the social experience of the individuals in the group.
5.6 Feedback loops: Positive and negative

The fifth condition for complex emergence that informed the structure of the IG unit was building in positive and negative feedback loops. Davis et al. (2008) describe a feedback loop as a “continuous and recursive process that takes part of a system’s output and feeds it back as an input” (p. 204). Positive feedback loops are mechanisms that function to amplify the things that make a system work, or work well, while negative feedback loops act to dampen the way the system works or, at best, to simply stabilize the system. Davis et al. observe that positive feedback loops can, if unchecked, contribute to an exponential or explosive increase in system functions, however such events are terribly common in the classroom setting because of a number of well-entrenched negative feedback loops.

5.6.1 Positive feedback loop #1: Emotioning

Davis et al. (2008) use the term “emotioning” to identify a type of positive feedback loop, explaining that “humans are biologically predisposed to mirroring and mimicking the emotions they encounter…so a teacher who manifests disinterest or distaste for a subject matter may well broadcast such attitudes to all present (p. 206).

As the teacher-researcher for this study, I understood that it was my responsibility to broadcast interest and enthusiasm for this unit (and other units) especially since it was new to most of the students. This was not difficult, as one of my greatest strengths as a PE teacher is feeling and showing a genuine interest in my students. I was also able build my own interest and enthusiasm for the unit by relating my childhood memories of playing games with my younger brother to the IG approach. I explained to the class that, as a child, I loved creating new games with my friends and my brother because it gave us a chance to be creative and spontaneous, and I encouraged them to understand that this unit would allow them to do the same. I could tell that a good number of students were starting to get excited about starting the unit. As my interest and enthusiasm developed, so did that of the rest of the class. As Davis et al. (2008) note, “a positive feedback loop can emerge when attitudes start to percolate through the system, prompting mirrored responses to mirrored responses” (p. 206).
5.6.2 Positive feedback loop #2: Showcasing

The showcasing of the games provided another positive feedback loop as the unit progressed. About halfway through the unit, students presented their game to the class by way of teaching it to another group. As the game was tested in this way, the remaining two groups assessed it on the basis of criteria that had been established at the outset and provided feedback accordingly (see Appendix D, which includes the Game Rubric and Feedback form). The added benefit of this showcase was that groups had the option to take useful ideas and incorporate these into their own games. John wrote, “this showcase was really beneficial because we got to see how other groups run their games and we used some of the ideas from their games for ours to make it better” (John, journal entry #4, October 18, 2013).

5.6.3 Turning outputs into inputs

As noted above, the decentralized structure of the IG unit allowed me to move ideas from one group and bring them to bear on similar problems experienced by another group. I was essentially taking outputs from the system and feeding it back as an input. For example, when the focus group attempted to devise a scoring system for their game that allowed for options to score—similar to basketball where players have the option to shoot for two points or three—I mentioned that another group had come up with the idea of giving one point if the ball hit the rim, and two points if the ball went in. This triggered the focus group to add a variation to their scoring system which involved positioning a soccer cone on top of the net and, if the cone fell off, an extra point would be scored. This example shows how a feedback loop was created in the decentralized structure of multiple groups, where ideas circulated in ways that helped different groups develop their games in creative ways.

The IG process established positive feedback loops by using “emotioning” to promote interest and enthusiasm for this unit. Enthusiasm “percolated” through the students in the class and, by the time the unit started, anticipation was running high. Once engaged in the process of inventing a game, the showcase strategy for testing the games provided a feedback loop. At this point, students not only received feedback about their game, but they were also
able to watch other games and thereby obtain ideas that might be useful to building their own game. Finally, the decentralized structure of the IG unit allowed me, as the teacher, to circulate through the class, moving ideas between groups.

5.7 Creating memories: Remembering and forgetting

During the school week, as soon as we returned home from school, my brother and I would race to change our clothes, and then head outside to play some kind of game in our back alley. As we got older and became more serious about playing cricket, more often than not, our games began to look more and more like a modified version of cricket. When I recollect our version of “street” cricket, I’m struck by the ways in which our game evolved over time. We started by using a hard ball (what were we thinking!), which soon broke a neighbour’s window and so we quickly replaced the hard ball with a tennis ball. We also changed the boundaries of our game: we had a rule that, if the ball was hit off our neighbour’s house and was caught, the batter was out; and, if the ball was hit into our neighbour’s backyard it was a “six” (equivalent to a homrun). This rule changed when our neighbor brought home a pit-bull.

Over the course of time we had to remember rules that worked, and forget rules that didn’t make our game more challenging, more fun, or safe. We didn’t write down the rules, or keep track of the changes, but they formed part of our collective memory, to be recalled as needed. Our rules were interconnected with the events and the physical constraints that prompted the changes and innovations, and they formed part of our shared experiences.

The condition to be discussed here—of the several conditions necessary for complex emergence—is that of creating memories: remembering and forgetting. The IG unit was structured with this in mind. According to Davis et al. (2008), for a system to learn, and to maintain its viability, it must have the means both to remember and to forget. Remembering
involves selection and preservation; once memories are selected, it is up to the system to go about preserving these memories.

In process of inventing a game for the IG unit, the students were required to track the progress of their game with the help of a planning package developed by the wider research project. As they worked through the material provided, they recorded their ideas, including their ideas about rules, different boundaries, and scoring systems. As the unit progressed they referred back to the package to remind themselves of rules that worked, and discarded rules that did not work. They also recorded their decision-making policy, revising it as needed, and took notes during the showcase to flag the ideas for their group planning process.

By requiring the students to track the progression of their game, and to refer to and revise their decision-making policy, the unit ensured that the memories were preserved in the process of creating and testing the game. Each of the IG packages were collected after each session (for safe-keeping); I then read through them to see what each group had developed. I quickly noticed that the IG groups were coming up with ideas that I had never considered incorporating into a game. Davis et al. (2008) note that “in an intelligent classroom collective things will arise that the teacher may not have considered” (p. 203). For example, the IG group created a rule that had the 7th person, who up until this time was subbing in and out of the game, come into the game as a rover, or opt to play offense for both teams. Davis et al. (2008) underscore the role of the teacher in the memory-keeping process: “the teacher not only selects interpretative possibilities, but also helps to register them in the collective memory” (p. 203). In this example, I shared the “rover rule” with the entire class to highlight a creative and innovative response to the requirement that all students be included, even when teams do not have an even number of players.

In summary, the IG unit accommodated the condition for complex emergence that required remembering and forgetting aspects of the process that worked or did not work. The students in the IG group were required to document the progress of their game and adjust the decision-making policy by way of the IG package. In this way, they were able to remember what worked and preserve it as a collective memory.
5.8 Limitations of the study

There were a number of limitations to this study due in part to group size, my dual role as researcher and teacher, and the rudimentary grouping of my subjects for the purposes of this research. First, the study focused on a small group of seven Grade 8 boys and, although their record of their lived experiences will be of interest to other PE teachers, the conclusions drawn here are by nature limited by the size of the study group.” Second, my dual role as teacher and researcher may have prevented the students from sharing all of their opinions and feelings about their experience with the process of inventing a game in the setting of my PE class. Finally, my decision to characterize the students as more experienced and less experienced simplified, to some extent, the complex issue of experience levels that individual students actually bring to the playing of territorial games. All seven students in the focus group differed in ability, cultural background, and experience with games, but, for the purpose of this study, I identified the students on the basis of these two groups.
Chapter 6: Implications for the PE community

This study has a number of implications for the PE community. The process of undertaking this study has also had a profound impact on my teaching practice. The goal of this study was to explore the lived social experiences of a group of grade eight boys as they engaged in a physical education unit that involved inventing a territorial game (an IG unit). My analysis of the data (from journals and interviews) revealed four themes: inclusion and the decision-making policy, acknowledging ideas, the student-selected team-selection process, and relating the IG experience to “real life.” I have also discussed the way in which these findings can be examined through a complexity lens.

This study has important implications for physical education teachers who want to provide a positive learning environment for diverse learners in the mainstream setting of PE. While these findings are in some ways unique to this particular group of students, the results are nonetheless useful, both to inform future research and to provide insights for PE teachers as they attempt to understand the attitudes and social experiences of their students during PE.

This final chapter will discuss the impact of my study on my teaching practice, with attention to its broader implications for the community of physical education teachers. Of all the observations made in the course of this study, by myself, my students, and my colleagues, there are four themes that I think best represent the multiplicity of issues and ideas that arose in the course of this work—themes that will continue to make a difference to my teaching practice, and to myself, as a teacher. These are: (a) the importance of the student voice, (b) the benefit of learning (social) skills in context, (c) the ways in which complexity thinking informed my study, and (d) IG as a vehicle for diversity and social justice.

6.1 The importance of the student’s voice

One of the most important aspects of this study was the way in which it provided students a means to express their lived social experiences. The students in the focus group for this study wrote daily entries in their journals for the purposes of my research, and they were also
interviewed by research assistants engaged with the wider study. The purpose of this was to obtain student perspectives on the nature of their social interactions in the course of the IG unit.

Why is it important for the community of PE teachers to gain a better understanding of the social experiences of students as they engage in physical education activities? Smith (1991) emphasized, rightly, that “before we, as adults, can anticipate success in our teaching endeavors, we must first learn gain some empathetic appreciation of the meaning of physical education for [the students]” (p. 412). Smith’s imperative echoes exactly the way in which this study has had an impact on my own teaching practice. By allowing my students the opportunity to voice their response to the experience of participating an IG unit gave me a number of valuable insights into why some students dislike PE. This was an significant revelation for me as most of my own youthful experiences with PE were very positive.

Consequently, most of the negative social experiences that were conveyed by the students in the course of this study would probably have gone unnoticed by me had the students not been able to express their reactions. I was unaware of the “hidden” negative social experiences of the students as they participated in the IG unit, and my predisposition would have prevented this awareness had I not been actively engaged in the study. My awareness of the group divide—between the more experienced (ME) and less experienced (LE) students—emerged through the interviews and the conversations; without these opportunities for students to voice their feelings, this hidden negative social experience would not have come to light. I did not realize the depth of the divide until I read the journals (after the grades for the unit were completed, as per my ethics guidelines). Through their journals, the LE students in the focus group were able to express their negative social experiences, including the experience of exclusion from the game-design process, the sense of humiliation and embarrassment that came with the team-selection process, and their frustration with the ME students as the LE students found that their ideas were not valued.

With these insights I am much better equipped to structure future PE units, especially those involving group activities. I now pay more attention to the way in which I select teams for PE
activities, and I take more time to address the decision-making process within these activities, both in both my math and PE classrooms. I require that the students take the time to create a decision-making policy and I have even used the “ideas box,” an innovation that originated with the focus group for this study. My new understanding of how students make sense of their lived social experiences has prompted me to plan and structure my lessons to consciously address issues of exclusion that came to light in the course of this study.

6.2 The importance of learning in an authentic context

An important aspect of this study was to engage the students in a teaching situation that was also authentic and meaningful in a wider sense. This has implications for my own teaching practice and, again, for the wider community of physical education teachers. The groups that participated in the IG unit for this study encountered situations where they were allowed to practice skills such as decision-making, conflict resolution, and cooperation, all in the process of engaging in the task of creating a game. During my first years as a teacher I focused my attention on skills acquisition, and on incorporating the necessary curriculum requirements into my lessons. I paid little attention to the subtleties of social domain. However, as I became more comfortable as a PE teacher, I moved towards teaching “bigger” issues, by way of content that was external to the physical domain and more oriented to social skills. My participation in the research group has developed my ability to build in and teach these bigger issues.

Prior to my participation in this study, when students were faced with situations that caused conflict or disagreement, or in situations where I witnessed exclusionary behaviour, I would make sure that a group discussion took place before the end of the class in order to address the issues. I would likely have related a story from my past or lectured the students on ways to solve the “problem.” In the course of undertaking this research and reviewing the relevant literature, I was able to identify this traditional method as problematic in as much as it isolates and decontextualizes skills, both physical and social—an approach that has been shown to be ineffective because it does not transfer well to other educational settings, and it has limited application outside of school (Davis et al., 2008). Granted, I addressed and
encouraged dialogue around incidents of exclusion and conflict as they surfaced in my classes, but I had the sense that I could do more in the way of developing a more creative and engaging approach.

The Inventing Games (IG) process—which falls under the umbrella of the game-based learning experience, Teaching Games for Understanding (TGfU)—provides a context in which students can develop their social skills and address issues relating to social justice in authentic and meaningful ways in the process of working in a small group to construct a game. Light (2003) explains that a basic premise of TGfU is to “situate all learning within authentic contexts and in doing so, gives skills meaning and draws on the connections between the students, the teacher, and the environment to develop more complete understandings of each other and of the game” (p. 169). Light’s summary aligns with my own goals as a PE teacher: to developing both physical and social skills in an authentic context. I have always known that, as a teacher, I wanted to encourage the development of skills that would go beyond the structured activities and be useful to my students outside of the classroom. My participation in this study, and my exposure to the literature related to this study, has allowed me to understand how to better structure an environment that will include social experiences that will better equip my students for life outside my PE classes.

6.3 Learning theories and complexity thinking

Instructional strategies should be based on learning theory because without a clear understanding of how students and teachers learn, one cannot expect to achieve clear learning outcomes. (Butler, 2005, p. 10)

Butler’s observation provides a clear rationale for having teachers strive for a better understanding of learning theory. When I first started teaching I remember being so busy planning “perfect” lessons, and worrying about the scope and sequence of my units, that there was no room to think about learning theories and how they applied to my practice.
In the course my involvement with the IG research group in the wider study, and my participation in the TGfU learning community, I have come to see the necessity—for myself and for my professional community—of acquiring a theoretical understanding of how learning occurs. The particular theory of learning that has informed both this and the wider study is “complexity thinking.” Three years ago, in 2011, when I joined the IG research group, I felt somewhat overwhelmed as I attempted to apply learning theory to the process of having my students invent a game. I remember thinking “why do we need to learn this? The kids are having fun inventing their game!”

As my graduate studies proceeded, I have come to realize that change to pedagogy requires teachers to arrive at an understanding of how students learn. While it is true that all teachers base their practice of teaching on some understanding of how learning occurs, it is also true that many teachers do not give enough credence to how learning theory can inform their practice (Light, 2008). Research shows that most teachers adhere rigorously to a personalized understanding of how students learn based on their own education, experience, beliefs, and values (Light, 2008).

I have always been inclined to develop my ability as a teacher so that my teaching practice does not stagnate. Taking a closer look at learning theory, specifically complexity thinking, as a way of enhancing my teaching was a natural fit for me. There are two interrelated aspects to complexity thinking that have had a particular impact on my teaching practice: the role of the teacher and the way in which the teacher creates and enhances the conditions for complex emergence.

6.3.1 The role of the teacher in complex emergence

In my own experience growing up, most of my PE teachers employed a direct or command style of teaching. They would start the class with a warm-up, followed by some form of isolated skill practice. We would then play a full adult version of whatever game we were “learning” at the time. As an undergraduate, I was exposed to alternative teaching models (such as TGfU) which allowed me to develop teaching strategies that allowed students to
participate at their developmental level, and which also challenged them cognitively, socially, and physically. As a teacher candidate I found, however, that the direct teaching model was still prevalent in high schools. Once I took up my first full-time teaching position, I found it difficult to incorporate the principles of TGfU, and at times I tended to fall back on a safe direct teaching method. It was not until I joined the IG research group that I began to critically examine that way I was teaching and to consider how I could contribute to making positive changes in my profession. My first step was to focus on this question: What is the role of the teacher?

Davis et al. (2008) explain that, “the most critical aspect of the teacher’s role is not provision of information, but participation with learners in the development of strategies to interpret that information” (p. 52). I remember the impact of this statement as I began to formally examine my role as a teacher, in my readings and through my participation in the IG study. I started to think about ways in which I could change the structure of my classroom setting to allow “students to create spaces that shape their learning, that allow players to actively struggle, ultimately leading to new insights” (Hopper et al., 2009, p. v). I quickly realized that I had to give up direct control of the learning process to allow students a space to self-organize their learning. The process of implementing an IG unit provided me with a useful and practical way to give my students the opportunity to self-organize, and it opened ideas and possibilities that I had not previously considered. Moreover, the decentralized structure of the IG unit allowed me to act as a facilitator rather than someone who has “all the answers;” I found that, during and after the IG unit, students were more inclined to use each other to solve problems instead of coming to me for answers. My perception of the role of the teacher has changed significantly in the course of my graduate studies, and my examination of complexity thinking in order to understand the conditions for complex emergence has been pivotal in transforming my teaching.

6.3.2 Conditions for complex emergence

As my teaching practice shifted to better support the students’ ownership of their own learning, I was nonetheless aware that the teacher still had an important role to play. My first
understanding of IG and complexity thinking left me thinking that I could just get students into groups and require them to invent a game. I quickly found that this was too much freedom for the students to manage well, and that I needed to provide them with more structure. In order to allow for complexity thinking, according to the advocates for this theory of learning, teachers are to create the conditions under which learning (or complex emergence) can occur.

Complexity thinking, as a theory of learning, informed the way this study was structured to allow for diverse and creative ideas to emerge even as conditions or constraints were placed on the game-design process. The inclusive decision-making policy, central to the IG unit, placed an enabling constraint on the process of creating a game which required that the diverse opinions of all the group members be considered. In addition, the decision-making policy was structured to allow the ideas generated in the process to “stumble” across each other as “neighbourly interactions” that occurred (and emergent ideas surfaced) within the IG groups and throughout the class. Students in the class also benefitted from keeping track of their ideas by way of using the IG planning package, a process that prompted them to remember what worked and what did not. All these conditions, necessary for complex emergence, were structured into the IG unit by the research group, under the guidance of the principal investigator, as the wider study progressed.

The concept of complexity thinking, and the process of complex emergence, have made a significant contribution to shaping me as a teacher. My goal now is to structure activities that set parameters for students that do not have predetermined the outcomes. I see the value in structuring enabling constraints into activities, especially where activities are organized in terms of a decentralized network with the teacher as facilitator. In this setting, students are more likely to be dependent one another (and less dependent on the teacher) when it comes to solving problems.

The most significant impact that the theory of complexity thinking has had on my teaching practice is that I now make a greater allowance for diverse opinions to be represented in the collective (my class, or groups within my class). It turns out that students are not only well
able to generate ideas that I have not considered, but that these ideas are useful for in my other classes. For example, the focus group came up with the idea of using a “rover” in the case where there was an odd number of players—an individual who could play offense for both teams. This rule change immediately made the game more inclusive because the extra person no longer had to sit out—an innovation I have used in my classes since then. It should also be remembered that this rule was created by an LE group member who was frustrated by “sitting out” all the time. Without the enabling constraint of inclusivity, this student’s opinion might not have been considered, and this rule might not have been discovered.

In conclusion, complexity thinking has informed my teaching practice by transforming my notion of the role of the teacher. In addition, by structuring my classes to allow for the conditions of complex emergence, I have created a more inclusive, holistic, and enjoyable environment. Finally, a clear benefit of having undertaken this study is that I have come to understand the relationship between my understanding of learning theory and my teaching practice.

6.4 Physical education and social justice

It was not the specific aim of my study to explore the presentation of social justice issues in the context of teaching PE, but the “hidden” negative social experience that a number of members of the focus group encountered is nonetheless an important issue, and one that is closely related to the core concern of this study—to consider student perceptions of their social experience in the context of a physical education unit which required participation in a small group setting.

6.4.1 Exclusion as a hidden social experience

A number of students in the focus group brought forward the issue of exclusion, an issue that plagued the group throughout the unit. Even more important was the revelation that students, especially those having less experience with team sports or territorial games, found exclusion to be a typical experience in PE activities, and that they had come to expect this from PE.
The LE students in the focus group found that their lack of sporting experience—and the perception on the part of the ME students that the LE students consequently had less ability—excluded them from the decision-making process and put them at a disadvantage in the team selection process. Fitzpatrick (2013) confirms this, observing that “all is not well in the realm of PE…exclusion continues to dominate the field” (p. 42).

This study gave me valuable insight into the nature of these feelings of exclusion, insights that were transmitted by members of the focus group (and others in the class) through conversations, journal entries, and interview transcripts. Prior to this study I could well have imagined that the groups were working well because they “looked busy,” were it not for the record of actual student perceptions. The journals and informal conversations revealed was that hidden or opaque forms of exclusion were occurring at several junctures in the course of inventing the game. Sibley (1995) observes that, in PE and social groups in general, some exclusion is obvious whereas other forms of exclusion are opaque or hidden. Fitzpatrick (2013) emphasizes that these opaque forms of exclusion happen every day in the PE setting, and urges that teachers expose the subtleties of exclusion.

In the focus group some exclusionary practices were obvious, particularly in the team selection process. When I saw that the teams were balanced in favour of the ME students, and that LE students were sitting out, I brought the group together to talk about what was happening. However, much less noticeable was the fact that students (again, mainly the LE students), were also not being included in the game-design process. It seemed to me, at the surface, that the group was progressing at a reasonable rate. As I circulated around the gym to check in on each group, the focus group appeared to agree that things were going well. However, the interviews and the journals told a different story, revealing that there were a number of incidents of exclusion that went unnoticed by me. When the principal investigator of the wider study suggested the focus group meeting I agreed, realizing this would be an ideal time to address the issue of exclusion.

As noted above, the main theme that emerged from this meeting was the issue of listening (or not listening), and the social skill of active listening was explored. In the end, the students
understood that active listening would allow them to better cooperate in order to finish inventing their game, and that active listening could aid them in future interactions with others.

As an outcome of having undertaken this study, I am now more aware, especially in my role as a PE teacher, of social justice issues, particularly the hidden forms of exclusion likely to occur in my classes. In addition to being aware of these issues, I now feel a responsibility to act on them as they occur, where in my early years as a teacher I may have ignored them. I am now also more equipped to deal with such issues as they occur in my class, knowing that group activities such as IG will provide students with the opportunity to deal with social justice issues in an authentic and meaningful setting.

The insights provided by this study, reinforced by my participation in the wider study, have promoted my growth as a teacher and have equipped me to better structure a classroom environment for greater inclusivity, one which takes into account the diversity of abilities and needs. By having students in the focus group share their lived social experiences with me, I gained an “insiders” view of the group dynamics. Had I not been able to read through the journals and interview transcripts, I may not have been aware of the hidden negative social experiences that occurred—and to which I now stay alert. My insights and new sensitivities will hopefully allow more of my students to enjoy PE and games the ways similar to my experiences as a child.

6.5 Conclusion

The purpose of this study was to explore the social experiences of a group of students as they engaged in creating a territorial game—in the course of an IG unit and in the setting of a physical education classroom. As the students worked to create their game in an authentic situation, they were prompted to develop their social skills and to acknowledge and address social justice issues. By examining the ensuing social experiences of the focus group students in the IG unit, it became clear that the conditions for complex emergence assisted the students in their game design process.
In my role as teacher-researcher I found that, at times, the students were able to work through problems on their own as a group by using the decision-making policy, while at other times I had to facilitate their participation by prompting the group to focus its attention back to the task. As Davis and Sumara (2006) note, “the teacher plays a key role in balancing sufficient randomness to allow for flexible, varied response and sufficient organization to channel such responses into coherent collective activities” (p. 45). Establishing the balance between giving students space to work on their own, and intervening to refocus their attention was key to enabling students to develop their social skills—including their management of social justice issues within their collaborative process as a group. This way, they had the initial freedom to deal with conflict, which made my eventual intervention to refocus their attention on inclusiveness both more meaningful and authentic. In the same way, by having the initial freedom to over-ride each other and experience exclusion, the intervention to address active listening by way of a group meeting made more sense to them. The IG process, with its predominant social focus, presents a unique opportunity for PE to address the social domain. This study demonstrates that, as teachers we are obliged to structure our activities to address the social interactions of students in ways that allow them to achieve positive social experiences.
References


“Moving Mountains” National Physical and Health Education Conference, Banff, Alberta.


Appendices

Appendix A: Wider Study Teacher Consent

Teacher Researcher Consent Form

Research Study

A Study of Situated Ethics through Inventing Games: Teacher Perspectives & Student Learning

You are being invited to volunteer in a research study to investigate how Inventing Games (IG), a physical education (PE) program where groups of students create their own games, might support the development of principles of ethical actions in students as they learn collaboratively. IG is an extension of the Teaching Games for Understanding (TGfU) curriculum model, which moves PE pedagogy further into democratized learning whilst sharing TGfU’s constructivist epistemology. Specifically, the research study will,

1) follow the processes, dynamics, and insights of students and teachers engaged in Inventing Games (IG), paying particular attention to the interactive structures that arise, and

2) determine whether awareness and performance of situated ethics for students transfers to ethical decision-making during game play of invented and institutionalized games.

The extend of your involvement will be explained below under study procedures.

Principal Investigator: Dr. Joy Butler, Curriculum and Pedagogy Department, Faculty of Education, UBC. Tel: 604 822-4974

Co-investigator: Dr. Tim Hopper School of Physical Education, University of Victoria. Tel: 250 477-8504

Study Procedures:

In this study we are seeking the involvement of at least eight teachers from elementary and middle schools to participate in the first year of the research study. Your commitment to the research study would be voluntary and would entail only year one which includes the following:

Year 1 (2010-2011) – Teacher Perspectives and Inventing Games Curriculum Development

To facilitate a sharing of ideas, planning time and teacher reflection we plan to schedule a series of up to six workshop type sessions—scheduled throughout the year starting in Fall 2010. Teacher on Call, travel expenses and lunch expenses will be paid by the research grant. These sessions will include practical workshops, discussion groups, the completion of two questionnaires (initial teacher perspectives and end of year teacher perspectives) and the
investigation of the conditions necessary for the emergence of learning within classes of students. During this first year teachers will be supported to develop two unit plans within the inventing games structure to reflect upon and develop further in the subsequent year of the project.

At the end of year one you will be invited to rejoin the study for the remaining two years, although you will be under no obligation to do so. The overview of the project for the last two years includes the following:

Year Two (2011-2012) – Investigating student learning and curriculum adaptation
Teachers will be invited to explore ideas of their unit plans with designated classes during September – December 2011. At two further workshop sessions, teachers will have the opportunity to share their implementation experiences. Units will then be ready for full implementation in January 2012. The following sequence will repeat in a recursive process throughout the 2 units: 1) Develop co-activity principles for student learning through inventing games process, 2) Develop situated ethics with parallel development of game skills and strategies 3) Develop Game Performance Assessment Instruments (GPAI) for students to develop the use of peer assessment, self-reflection journals from guided questions and group debriefings, and 4) Integrate video feedback for students to review refinement of games and to develop insights on their decision making processes as they review videos of their lessons.

Year Three (2012-2013)
Three lessons by each teacher in each unit will be observed by investigators and video recorded, with the focus being on students learning process. During the inventing games unit these observations will occur during 1) game construction, 2) game showcasing and 3) development of strategies in game play. During the two institutionalized games unit following the inventing games units, the observations will occur as follows: 1) lesson two, 2) lesson 4/5, 3) lesson 7/8. Following each lesson, identified students will view the video clips and (as in the previous year) be asked to ‘think aloud’ about their decisions and actions in order to re-examine the antecedents of their decision making. Consequent student insights will allow comparison of the modes of engagements of students in the various teachers’ lessons.

Application for ethics approval at UBC will be made yearly. Approval from your principal and district will be needed and will be pursued by the Principal Investigator. In the third year, a more extensive ethics application will be made to include the assent and consent of students being taught in the two unit plans, and also, that of their parents.

Potential Benefits:
The potential benefits for teachers are to:
1) develop an awareness of new pedagogical methodologies in teaching P.E. such as TGfU,
2) develop a deeper understanding of their teaching philosophy and the way this impacts their decisions about curriculum design, pedagogical decisions and ways to assess learning,
3) identify ways to implement the TGfU teaching model into their teaching practice,
4) Improve learning experiences for the students,
5) connect to educational goals of the school

Confidentiality: All documents will be identified only by code number and kept in a locked filing cabinet. Teachers will not be identified by name in any reports of the completed study. Transcriptions and analyzed data will be kept on a memory stick and stored with the raw data. Only the principal investigator, co-investigator and assigned graduate students will have access to this data during the research project. Documents, tapes and files will be kept for 5 years before being destroyed.

Contact for information about the study: If you have any questions or desire further information with respect to this study, you may contact Joy Butler (604) 822-4974 or Tim Hopper (250) 477-8504.

Contact for concerns about the rights of research subjects: If you have any concerns about your treatment or rights as a research subject, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598, or if long distance, by e-mail to RSIL@ors.ubc.ca.

Consent:

- My participation in this study is entirely voluntary and I may refuse to participate or withdraw from the study at any time.

- My signature on page four indicates that I have received a copy of this consent form for my own records. My signature also indicates that I consent to my participation in this study.

- With my identity protected by use of a pseudonym, I consent to the use of the following in the dissemination of the research findings of the study:
  - Anonymous verbatim quotation of sections of my questionnaire response in publications and presentations by the investigators at venues such as scholarly conferences and seminars disseminating the study’s outcomes.
Research Study

A Study of Situated Ethics through Inventing Games: Teacher Perspectives & Student Learning

I ________________________________ consent to my participation in this study.

Print name

Participant’s Signature ________________________________ Date ________________

Report copy of the findings:

If you would like a report copy of the findings please provide a mailing address or an email address where this can be sent:

Name: ____________________________________________________________

Email ____________________________________________________________

Address __________________________________________________________

City: ____________________ Province: ________ Postal Code: ____________

Your participation in this study is greatly appreciated.

Sincerely,
Appendix B: Letter of Consent

April 5, 2013

Letter of Consent for student involvement

Dear Parent,

About a year ago you signed a consent form giving permission for your child to take part in a research project conducted by researcher Drs. Joy Butler and Tim Hopper. *(A copy of the original consent form will be provided on request.)* As a reminder the research investigated how Inventing Games, a physical education (PE) program where groups of students create their own games, supports the development of principles of ethical actions and the development of students’ game playing skills. This was concluded at the end of term 2 *(March 15th, 2013).*

The next step in the process is to analyze the data, which we have collected in the form of questionnaires and interviews. This letter invites you to give permission to Mr. Sandher the same privileges as the original researchers, which will allow him to analyze the data collected. The data collected has not been examined by him up to this point and will not be until permission is granted. No further data will be collected. To ensure that there is no conflict of interest, grades for these units have already been submitted prior to the end of term two. If you choose not to grant permission for Mr. Sandher to analyze your son’s data, any data related to him will not be reviewed by Mr Sandher.

**Contact information for further research study information:** If you have any questions or desire further information with respect to this study, you may contact
My signature here indicates that I give consent for Mr. Sandher to be included in the research analysis phase of the project and to include your son’s responses in the questionnaires, journals and interviews as part of his Master’s research project. Your son’s identity will be protected by a pseudonym. No new data will be collected.

If you do not return the signed consent your son’s data will not be included in Mr. Sandher’s research project.

Please attach this appendix to your original consent form. A copy of the consent form will be provided on request.

Name of Student: ____________________________

________________________________________
Parent or Guardian Signature Date

________________________________________
Printed Name of Parent or Guardian signing above

Your son’s participation in this study is greatly appreciated.
Appendix C: Letter of Assent

ASSENT FORM

April 5, 2013

Dear Prince of Wales Secondary Student,

You have just completed two units which explored how students decide to do what they do as they are playing a game. The investigation focussed on physical education lessons called ‘Inventing Games’ and a unit on the game of Handball. Mr. Sandher taught this unit starting in November of 2012. All of the students in Mr. Sandher’s block 1-2 grade 8 boys PE class participated in the two units.

As we have now completed the in-class research and all grades have been finalized for term 1 and term 2, the next step in the process is to analyze the data which we have collected. By signing the attached assent form you are volunteering to allow Mr. Sandher the same privileges as the original researchers, which is to analyze the data collected (interview transcriptions, journals and questionnaires). The data collected has not been viewed by Mr. Sandher to this point and will not be, until permission is granted. Mr. Sandher plans to use this data as part of his master’s research project. All students identities will be protected by pseudonyms.

In addition to the attached assent form, you will be handed out a consent form to take home and ask your parents to give their consent for the data to be analyzed by Mr. Sandher. You will have one week to discuss it with your parents/guardians, get it signed and returned to Mr Sandher.

Yours sincerely,

Mr. Kevin Sandher
ASSENT FORM

Research Study: Year Three
A Study of Situated Ethics through Inventing Games:
Teacher Perspectives & Student Learning

Consent:

1) The data collection procedures involved in this study have been explained to me and I have been given the opportunity to ask questions regarding this project and my involvement;

2) I acknowledge that:
   - My identity will remain protected in the dissemination of the study’s findings and will be made known only to this researcher;
   - The study is for the purpose of research and not treatment;
   - I have been informed that I am free to decline to participate in, or withdraw from, the study at any time without consequence;
   - If I have any concerns about the treatment I received or my rights as a research participant, I may contact the Research Subject Information Line in the UBC Office of Research Services;
   - I have been given a copy of this consent form;
   - With my identity protected by use of a pseudonym, I consent to the use of the following in the dissemination of the research findings of the study;
     - Verbatim quotation of sections of my questionnaire and journals in publications
     - Excerpts of video recordings of me in presentations by the investigator at venues such as scholarly conferences and seminars dissemination the study’s outcomes.

3) I consent to Mr Sandher viewing the interview transcriptions, journals and questionnaires and including some of the data in his Master’s research project.

Signature: ____________________________ Date: ________________

Name (printed): ________________________ Tel: ________________
Email: _________________________________
Appendix D: Unit Plan

INVENTING GAMES UNIT
NOTES FOR TEACHERS

Introduction

1. Introduce the concepts of territorial games

Main intent of territorial/invasion games:
- To invade opponent’s defending area to score a goal while simultaneously protecting own goal.

Concepts
- **Offensive Concepts**
  - Keep possession
  - Penetration / invasion
- **Defensive Concepts**
  - Stop the opposing team from scoring
  - Defend space (zone) or players
- **Transpositional concepts**
  - Obtain possession
  - Moving from offense to defense and vice versa

Examples of games
- Basketball, field / ice hockey, football, lacrosse, netball, soccer, team handball, water polo, ultimate Frisbee

1. Use charts to show different types of playing areas, balls, equipment, rules, regulations
2. Connect student work with other disciplines (e.g. Art for designing equipment, Maths for drawing out court dimensions, English for description of the game).

OUTCOMES:
Students will be able to:
1. Identify games in the territorial classification
2. Identify intent of all territorial games (TG)
3. Start to appreciate potential for transfer of concepts from one territorial game to another

<table>
<thead>
<tr>
<th>INTRODUCTION</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three examples of TG games</td>
<td>3 examples</td>
<td>2 examples</td>
<td>1 examples</td>
<td>0 examples</td>
</tr>
<tr>
<td>Characteristics of TG</td>
<td>Goal at each end Boundaries clear Attack while defending Transposition Player roles</td>
<td>2 examples</td>
<td>1 examples</td>
<td>0 examples</td>
</tr>
<tr>
<td>Similarities of TG</td>
<td>Concepts and strategies – eg. give and go</td>
<td>2 examples</td>
<td>1 examples</td>
<td>0 examples</td>
</tr>
<tr>
<td>Differences of TG</td>
<td>Different means to move the object</td>
<td>2 examples</td>
<td>1 examples</td>
<td>0 examples</td>
</tr>
</tbody>
</table>
STAGE 1  ESTABLISH THE GAME THROUGH DEMOCRATIC PROCESS

1. Break class into groups of 6 (e.g. 3 vs 3)
2. Have groups work through sheets (by responding to facilitating questions)
3. Identify 5 rules, name of game, playing area, ball, equipment, scoring system etc.

OUTCOMES
Students will be able to:

1. Be introduced to ‘Inclusive Decision-Making’ which includes:
   a. consensus building
   b. group decision-making process
   c. majority rules voting
   d. conflict resolution
   e. involving all in process

2. Understanding need for rules in a game. Rules can enable the game to:
   a. Flow
   b. Give structure to the game
   c. Create a safe environment for all
   d. Establish fairness
   e. Involve everyone
   f. Make it fun

ASSESSMENT RUBRIC FOR STAGE 1

<table>
<thead>
<tr>
<th>ESTABLISH THE GAME THROUGH AN INCLUSIVE PROCESS</th>
<th>YES</th>
<th>How?</th>
<th>NO</th>
<th>Why not?</th>
</tr>
</thead>
<tbody>
<tr>
<td>a consensus building</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b group decision-making process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c majority rules voting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d conflict resolution</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e involving all in process</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
STAGE 2   PLAY THE GAME!

1. Invite one or two students from each group to collect equipment
2. Establish boundaries for each group’s game
3. Observe the games
4. Facilitate discussions about the goals, object (ball / puck), implements and rules
5. Establish a system for equipment distribution and collection – create an equipment mediator

OUTCOMES

Students will be able to:

1. Create own boundaries, goals, rules
2. Decide if the game is working
3. Discern if it is fun

ASSESSMENT RUBRIC FOR STAGE 2

<table>
<thead>
<tr>
<th>PLAY THE GAME</th>
<th>YES</th>
<th>How?</th>
<th>NO</th>
<th>Why not?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish boundaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Created at least 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rules</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Created safety rule</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is this game fun?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
STAGE 3  REFINE THE GAME

1. Allow a few time-outs during game play and ask the following questions:
   a. Does the game flow?
   b. Is the game structured?
   c. Is it safe for everyone?
   d. Is the game fair for everyone?
   e. Is everyone involved?
   f. Is it fun?

If the answer is ‘No’ to any of these questions, students should spend some time changing or adding rules.

2. To enable a fair decision-making structure – create a ‘Committee” box. Any student in the group may take one of the following cards to write out their idea or proposal:
   a. Change existing rule Card
   b. Add rule Card
   c. Drop existing rule Card
   d. Restate rule Card

The group needs to vote on the proposal a member brings to the discussion. Inclusive principles of majority votes apply.

3. Teacher may need to facilitate the modification of the game to help make the game easier or more challenging (e.g. reduce playing space, rotate positions for all players).

OUTCOMES

Students will be able to:
1. Negotiate with team mates rules that need changing, deleting or adding.
2. Change regulations in terms of boundaries, equipment, goals etc.
3. Differentiate between regulations and rules.
4. Appreciate the need for rule & regulation changes and understand why rules changes happen at the institutionalized games level.

ASSESSMENT RUBRIC FOR STAGE 3

<table>
<thead>
<tr>
<th>Have the Rules made the game:</th>
<th>Y</th>
<th>How?</th>
<th>N</th>
<th>Why not?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structured?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safe for all?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fair?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involve everyone?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fun?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Were you able to:
Negotiate w/team mates about rules changes
Negotiate about regulation changes
Know the difference between rules & regs?
Understand why changes need to happen
STAGE 4  ESTABLISH THE OFFICIAL’S ROLE

1. Identify student who will reinforce the rules and administer consequences if the rules are violated. Rotate this position often.
2. Students pre-determine what these consequences will be.

OUTCOMES

Students will be able to:
1. Understand need for rules and appreciate consequences for their violation
2. Respect official’s decision

ASSESSMENT RUBRIC FOR STAGE 5

<table>
<thead>
<tr>
<th>ESTABLISH THE OFFICIAL’S ROLE</th>
<th>Y</th>
<th>How?</th>
<th>N</th>
<th>Why not?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has developed officiating qualities such as:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Knows rules</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Sees infractions &amp; use whistle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Makes decisions based on incident</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Moves to see action clearly</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
STAGE 6  SHOW CASE ALL THE GAMES

1. The coach from each group explains the game to the rest of the class
2. The group then shows the class the game
3. The rest of the class is invited to comment or make suggestions about improvements
4. Pair up groups
5. Have each group play the ‘other’ game with the coach explaining and guiding the process
6. Students can then choose which game they wish to play
7. If all students prefer one game – then both groups can play it (in my experiences students always pick the game they have invented).

OUTCOMES

Students will be able to:

1. Make informed choices
2. Learn responsibility that goes with making choices

<table>
<thead>
<tr>
<th>SHOWCASE ALL THE GAMES</th>
<th>Y</th>
<th>How?</th>
<th>N</th>
<th>Why not?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrate game</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose a game from own choice</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E: Student Handout Sheet

INVENTING GAMES WORKSHEET

What are territorial games? What makes territorial games different from other games categories?

What are some of the differences (3) of the games in territorial games?

1
________________________________________________________

2
________________________________________________________

3
________________________________________________________

Other comments:
**STAGE 1   PLAY THE GAME**

a. *What will be your playing area? What will be the purpose of each line?* Use the space below or the back of this sheet to illustrate your ideas.

b. *What ball will you use (or other equipment)?* Draw it and give dimensions where possible.

______________________________
______________________________
______________________________
______________________________
______________________________
______________________________

ccc. *What will your goal look like?* Draw it.

______________________________
______________________________
______________________________

Dr. Joy Butler (joy.butler@ubc.ca)
University of British Columbia
d  How will you move the ball?

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________


e  What equipment do you need to start your game?

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________


f  What is the name of your game?

_______________________________________________________________________


g  What are five of the rules for your game? (include 1 safety rule)

1  
_______________________________________________________________________

2  
_______________________________________________________________________

3  
_______________________________________________________________________
Safety rule

h  Is this game challenging? Why?

i  Is this game fun? Why?

STAGE 2    ESTABLISH THE GAME THROUGH DEMOCRATIC PROCESS

How did you make decisions in your group?
How did you make sure that everyone was included?

_______________________________________________________________________
_______________________________________________________________________

What do you think is the best way to resolve differences?

_______________________________________________________________________
_______________________________________________________________________

**STAGE 3  REFINE THE GAME** - (take a few time-outs during game play and ask the following questions)

   a) Does the game flow?
   b) Is it safe for everyone?
   c) Is the game fair for everyone?
   d) Is everyone involved?
   e) Is it fun?

If the answer is 'No' to any of these questions, think about changing or adding some more rules

How did the Committee Box work for your group?

_______________________________________________________________________
_______________________________________________________________________

Were you able to change the rules and regulations satisfactorily? How so?

_______________________________________________________________________
_______________________________________________________________________
STAGE 4 - HOW WILL YOU MAKE TEAMS FOR YOUR GAME

Will you leave making teams up to the participants?

Will you make teams based on ability? Random?

STAGE 5  ESTABLISH THE OFFICIAL'S ROLE

What is the role of the official?

_______________________________________________________________________

_______________________________________________________________________

What are some of the skills of an official?

_______________________________________________________________________

_______________________________________________________________________

STAGE 6  SHOW CASE ALL THE GAMES

How did your demonstration go?

_______________________________________________________________________

_______________________________________________________________________

What games did you enjoy watching the most?

_______________________________________________________________________

Which would you like to try?

_______________________________________________________________________

Dr. Joy Butler (joy.butler@ubc.ca)
University of British Columbia
Appendix F: Showcase Structure

IG SHOWCASE

What: In class four you will present your game to the rest of the class. This will not be the finished game but a “work in progress.”

Structure: You will have 10 minutes to teach your game to another group. You will have to pick one or two people from your group who will teach the game to the selected group. The two groups who are not either teaching the game or playing the game will be providing feedback to the presenting group. This feedback will help the presenting group in the final three classes revise their game. The feedback will be based on the criteria we established of “what makes a good game?”

Schedule:

8:40 – 8:50
Students will get into their groups to gather their equipment and go over final details

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Time</th>
<th>Presenting Group</th>
<th>Playing Group</th>
<th>Feedback Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8:50 – 9:00</td>
<td>1</td>
<td>2</td>
<td>3/4</td>
</tr>
<tr>
<td>2</td>
<td>9:05 – 9:15</td>
<td>2</td>
<td>3</td>
<td>4/1</td>
</tr>
<tr>
<td>3</td>
<td>9:20 – 9:30</td>
<td>3</td>
<td>4</td>
<td>1/2</td>
</tr>
<tr>
<td>4</td>
<td>9:35 – 9:45</td>
<td>4</td>
<td>1</td>
<td>2/3</td>
</tr>
</tbody>
</table>

After the four rotations have been completed all groups will collect their feedback forms and put this in their IG package to use for the following classes.
GAME RUBRIC AND FEEDBACK

Please use the following rubric to help the presenting group revise their game after the games showcase.

The following categories will be used to assess your game during showcase sessions.

<table>
<thead>
<tr>
<th>Category</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game Flow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Game Safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Involvement of all players</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure of Game</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FUN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FEEDBACK

Please provide as much feedback as possible for the presenting group. Use the questions below to guide your feedback.

What were aspects of the game that worked well? Why?

What were aspects of the game that need improving? Why?

Were there aspects of the game that you might find useful for your group? Why?

Any other feedback is helpful.
Appendix G: Journal Questions

Student Journals

Following each class during the IG unit you will have 20 minutes during the “silent reading” break to reflect on the class that you just participated in.

During this reflection you will write about:

(a) The social experiences of creating your game – Did the group construct the game inclusively? Why or why not? Did the group include your ideas? Why or why not? Did the group use your inclusive decision-making policy? Why or why not?

(b) Connect any past experiences you have with playing games in PE or outside of school?

(c) Any other aspect that you experienced during the class that you would like to share.

During the final class you will be asked to reflect on the entire unit as a whole. Thinking about questions such as:

(a) Did you find the IG unit useful?

(b) What did you learn about cooperation, inclusiveness and making decisions?

(c) What changes would make if we were to do the unit again?

At the end of each class I will collect the journals and keep them locked up.
Appendix H: Interview Questions

1. What did you learn in this inventing games unit?

2. *(Before the unit you wrote about your expectations of what you might be learning. You can re-read your answers.)* Did you meet those expectations? Yes / No Explain.

3. *What* did you learn that you did not expect to learn?

4. What did you learn about decision-making?

5. *Did* the process of making up a game in your group help with decision-making and your tactical decisions as you played your game?

6. *When inventing your game what* did you and your group learn about:
   a. Fairness
   b. Involving Everyone
   c. About Making Game Flow

7. *What* were the main challenges that you group had to deal with?

8. *How* did you address these challenges?

9. Do you think this unit is useful for students to learn? Why?
Appendix I: Mind Map of Themes

Mind Map of Themes